

Canadian Journal of **PUBLIC HEALTH**

The National Journal of Preventive Medicine

Volume 49

DECEMBER 1958

Number 12

UNIVERSITY
OF MICHIGAN

PHYSICAL MEDICINE AND REHABILITATION IN A GENERAL HOSPITAL

J. Berkeley

DEC 22 1958
PUBLIC HEALTH
LIBRARY

THE BRITISH COLUMBIA DEPARTMENT OF HEALTH AND WELFARE

G. F. Amyot and R. D. Defries

DIET AND DENTAL HEALTH IN NEWFOUNDLAND CHILDREN

Tung Yu Lin and M. Doreen Smith

AN EPIDEMIC OF Q FEVER AT PRINCEVILLE, QUEBEC

Vytautas Pavilanis, Laurent Duval
A. Roger Foley, Marc L'Heureux

Index to Volume 49, 1958

Published Monthly by the

CANADIAN PUBLIC HEALTH ASSOCIATION
150 COLLEGE STREET, TORONTO 5

SCHOOL OF HYGIENE

UNIVERSITY OF TORONTO

*Postgraduate Training for Physicians, Veterinarians,
Dentists, and other University Graduates*

DIPLOMA AND CERTIFICATE COURSES

- Diploma in Public Health (D.P.H.)
- Diploma in Industrial Health (D.I.H.)
- Diploma in Veterinary Public Health (D.V.P.H.)
- Diploma in Dental Public Health (D.D.P.H.)
- Diploma in Hospital Administration (Dip.H.A.)
- Diploma in Bacteriology (Dip. Bact.)
- Certificate in Public Health (C.P.H.)

COURSES FOR PHYSICIANS

Physicians may enrol in the following courses: D.P.H., D.I.H., Dip.H.A., Dip. Bact. The *Diploma in Public Health* course provides the basic academic instruction needed for physicians entering the field of Public Health as Medical Officers of Health, or as physicians working full-time or part-time in specialized branches such as infectious diseases, tuberculosis, epidemiology, bacteriology, medical administration, health insurance.

The *Diploma in Industrial Health* course provides the basic academic instruction needed for physicians entering the field of occupational medicine, especially industrial health, either as full-time or part-time medical officers in plants or industrial organizations. It is not now necessary for candidates entering this course to have first taken the D.P.H. course.

The *Diploma in Hospital Administration* course provides instruction for physicians and other university graduates taking up careers as hospital administrators.

The *Diploma in Bacteriology* course provides basic academic instruction in the following branches of medical microbiology: systematic and applied bacteriology and virology, public health bacteriology, mycology, parasitology; a course in statistical methods forms part of the curriculum.

A year of attendance, provided a diploma is obtained, satisfies part of the requirements for the Certification or Fellowship programs of the Royal College of Physicians and Surgeons of Canada in the approved medical specialties.

COURSES FOR VETERINARIANS AND DENTISTS

Veterinarians may enrol in the Diploma in Veterinary Public Health and the Diploma in Bacteriology courses.

Dentists may enrol in the Diploma in Dental Public Health and the Diploma in Bacteriology courses. These courses provide suitable training for those intending to enter public service, or to take up careers in teaching or research.

COURSES FOR OTHER UNIVERSITY GRADUATES

Graduates with degrees in arts or science may enrol in the Dip.H.A., Dip. Bact. or C.P.H. courses. The C.P.H. may be taken as a general course in public health administration, or as a course providing specialized training in nutrition, sanitation, bacteriology, or public health education.

DURATION OF COURSES

All courses are of 32 weeks' duration except the Dip.H.A. course which extends over two years, the second year being spent as a resident in hospital administration. Courses commence in early September of each year.

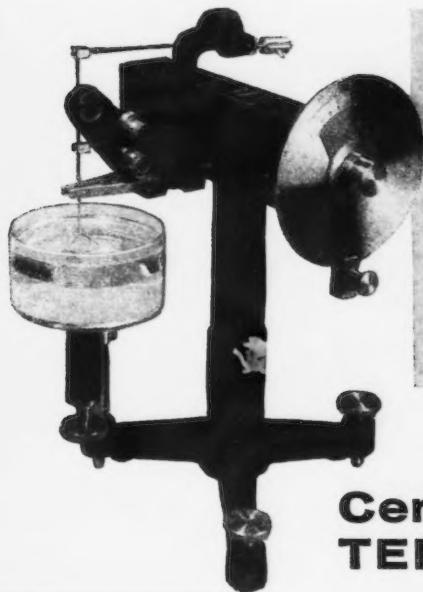
BURSARY ASSISTANCE AND FELLOWSHIPS

Bursary assistance may be available to candidates approved by Provincial Departments of Health. Overseas candidates should consult their government about Fellowships.

FOR FURTHER INFORMATION write to: Dr. A. J. Rhodes,
Director, School of Hygiene, University of Toronto, Toronto 5, Ontario.

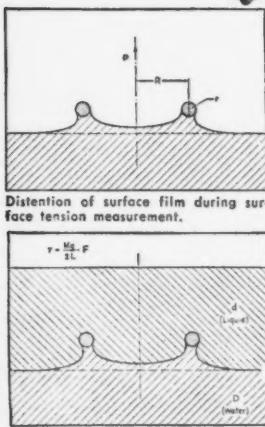






*For utmost
accuracy
in the
measurement
of
SURFACE
PHENOMENA*

Cenco-du Nouy® TENSIOMETER



Distension of surface film during surface tension measurement.

Distension of interfacial film during interfacial tension measurement.

This precision apparatus provides for the determination of both surface and interfacial tensions by the ring method. Complete determinations can be made in a matter of minutes. Readings are direct from the scale, reproducible to within ± 0.05 dyne. (See ASTM D971-50).

No. 70545 (illustrated) for measurement of forces required to break interfacial and surface tensions by both upward and downward movement of ring, complete with platinum ring and metal carrying case...each **\$552.50**

No. 70535, for measurement of upward interfacial and surface tensions, complete with platinum ring and metal carrying case each **\$383.50** Sales tax extra, if applicable.

Ask for your copy of Bulletin 102.

It contains full details about these and other Cenco instruments for measuring surface phenomena.

CENTRAL SCIENTIFIC COMPANY OF CANADA, LIMITED

146 KENDAL AVE., TORONTO 4, ONTARIO • 7275 ST. URBAIN ST., MONTREAL 14, QUEBEC
1206 HOMER STREET, VANCOUVER 3, B. C. • 130 SPARKS STREET, OTTAWA, ONTARIO
Sole distributors in Canada of RS and AC-ME oil and gas testing apparatus made by Refinery Supply Company, Tulsa, Oklahoma



Canadian Journal of PUBLIC HEALTH

VOLUME 49

DECEMBER 1958

NUMBER 12

CONTENTS

ARTICLES:

Physical Medicine and Rehabilitation in a General Hospital.....	499
<i>J. Berkeley, M.B., Ch.B., M.D.(Glasgow), D.P.H.</i>	
The British Columbia Department of Health and Welfare.....	503
<i>G. F. Amyot, M.D., D.P.H. and R. D. Defries, M.D., D.P.H.</i>	
Diet and Dental Health in Newfoundland Children.....	516
<i>Tung Yu Lin, B.Sc., M.A. and M. Doreen Smith, M.A., Ph.D.</i>	
An Epidemic of Q Fever at Princeville, Quebec	520
<i>Vytautas Pavilanis, M.D., Laurent Duval, M.D., D.P.H., A. Roger Foley, M.D., Dr.P.H. and Marc L'Heureux, D.V.M.</i>	

EDITORIAL SECTION:

Our Answer to Our Association's Need.....	530
---	-----

DEPARTMENTS:

News Notes.....	531
INDEX to Volume 49, 1958.....	i

The Canadian Journal of Public Health is published monthly by the Canadian Public Health Association. Editorial and business offices, 150 College Street, Toronto 5, Ontario. Subscription in Canada \$3.00 a year, payable in advance. Subscription rate outside Canada \$5.00 a year. Single copies 50 cents. Authorized as second-class mail, Post Office Department, Ottawa. Contents may be reproduced only with the permission of the Editorial Board.

Canadian Journal of **PUBLIC HEALTH**

VOLUME 49

TORONTO, DECEMBER 1958

NUMBER 12

Physical Medicine and Rehabilitation in a General Hospital¹

J. BERKELEY,² M.B., Ch.B., M.D. (GLASGOW), D.P.H.

THE trend is increasing towards developing rehabilitation services in general hospitals. In this paper are considered some of the problems encountered by hospital medical staff and administrators in creating these new services.

Terminology. There is confusion in terminology. Rehabilitation is currently used in so many different ways, that persons meeting to plan rehabilitation programs talk at cross purposes until such time as all concerned can agree on the definition of the terms. Commonly, the vocational part of the rehabilitation process is regarded as the total rehabilitation process or the medical rehabilitation part, or the physical medicine part.

Change of concept. There is the difficulty of attempting to widen the mental horizons of doctors, nurses, administrators who, traditionally, follow conservative viewpoints. Hospital facilities and personnel have primarily been geared to improving function of a diseased organ, or specific body part, e.g. appendix, stomach, heart, etc., but rehabilitation concepts set wider objectives and require that hospital facilities be geared to improving function of the individual as a whole physically, (which is medical rehabilitation) and in relation to society, (which is social and vocational rehabilitation). The change of concept in the minds of key hospital personnel is a prerequisite for good rehabilitation service.

Creation of additional services

(a) **Medical rehabilitation service.** The medical staff who accept the widened concept of maximum physical usefulness as the objective of hospital treat-

¹Presented at the 45th annual meeting, Canadian Public Health Association, Toronto, Ontario, May 29-31, 1957.

²Medical Director, Department of Physical Medicine, Metropolitan Hospital, Windsor, Ontario, and of the Red Cross Centre, Windsor, Ontario.

ment, and who seek to accomplish this objective, need an additional medical service. This is the physical medicine service, comprising physical therapy and occupational therapy sections. The physical therapy section deals with those secondary problems in muscle strength and joint motion which are the sequel to a variety of primary disabilities. The attending physician himself rarely has the time to treat adequately the stiffness and weakness which are the sequel to primary disabilities of stroke, arthritis, injuries, etc. Furthermore, some patients require special apparatus, or special therapies, in which the attending physician is not adequately skilled. Nor can the physician unaided attain the objectives of the occupational therapy section, of the physical medicine department, which is concerned with the improvement of function, especially with upper limb function through the use of suitable repetitive exercises in the form satisfying to the patient, or through the use of mechanical contrivances (e.g. self-aid devices, wheel chair modification, etc.). Special equipment for physical and occupational therapy with space to house it, and skilled therapists are required. Early treatment can thus be provided to minimize those secondary disabilities in joint motion, muscle strength and limb function which are the precursors to disabilities in physical usefulness.

Therefore, medical staffs are confronted with the problem of obtaining from the hospital administration space, equipment, personnel for the department of physical medicine and of educating the medical staff in how to use the new department of physical medicine especially to prevent secondary disabilities, and to treat and minimize secondary disabilities. They are concerned, too, with educating hospital and nursing staff in how to work along with the physical medicine department in preventing and treating crippling disabilities and with appointing a suitably qualified physician to be director of the department.

(b) *Creation of additional services.* These include social and vocational rehabilitation services. When the medical staff further extend their objective from the concept of "maximum physical usefulness" to the concept of "maximum physical usefulness as a working member of society", another increase of facilities and personnel becomes necessary, namely, those required for social and vocational rehabilitation. Medical social worker, psychologist, vocational placement officer are among personnel required. Fortunately, space requirement in the hospital is minimal and the facilities can be those of community agencies. The problem is to make such personnel and community agencies available to the hospitalized patient. This problem, unlike that of medical rehabilitation, does not rest primarily on the shoulders of the medical profession, but devolves on the hospital board, community and society as a whole.

Convalescent and chronic disease facilities. Long term, or severely disabled patients needing prolonged physical medicine therapy should not long be retained in a general hospital. They should be transferred to a convalescent wing at the hospital, or another center. This saves money, frees an acute hospital bed, and frees time of the physical medicine personnel in the general hospital to do better their main job—which is the early treatment and prevention of crippling disability. Such transfer also saves the expense of creating recreation and expanded occupational therapy facilities which are required by

long term patients but not by the usual general hospital patient. The problem is often present of creating suitable facilities of this type.

Integration of medical, social, vocational rehabilitation. For most patients in a general hospital, the physician in charge of the case will accomplish medical rehabilitation and will refer the patient for appropriate social and vocational rehabilitation service, accomplishing thus "total rehabilitation". In some complicated cases, however, the important decisions on combined rehabilitation objectives are difficult, e.g. where a decision in further surgery is inter-related with a decision on re-training, or where either or both are influenced by the possible social disposition. The problem thus presents of how to organize team assessments for such difficult cases.

DISCUSSION

The above problems are more easily posed than answered, and the answers will vary greatly from locality to locality.

Terminology. Of several definitions I like best the following: "Total rehabilitation of a disabled person is the planned attempt to help that person achieve maximum usefulness, physically, socially, vocationally". Medical rehabilitation means maximum usefulness physically; social rehabilitation means maximum usefulness in relation to society; vocational rehabilitation means maximum usefulness in relation to occupation. Only the integration of these three components should be called rehabilitation.

Change of concept. The answer to this problem lies in education of key hospital personnel. The role of educator is frequently assigned to the department of physical medicine and one of the major functions of this department should be to effect, by precept and example, the widened concept of total rehabilitation among hospital medical staff.

Medical rehabilitation service. The medical staff need to be educated in early case finding for referral to the department of physical medicine for the prophylaxis of crippling. The nursing staff require to be educated in bed positioning, bed exercises and self care activities.

The department of physical medicine is again the educator and should assume the responsibility for a continuing education program. The physician who is director has the responsibility for this program. He should, therefore, have direct access to, or preferably be a member of the medical advisory board of the hospital or institution, in order to maintain continuous liaison with the chiefs of the different sections. A useful suggestion, which the author has found helpful, is to have a physical medicine notice board in the doctors' lounge, and on the notice board in the nurses' or supervisors' lounge. At regular intervals, on such a notice board, data on physical medicine and rehabilitation procedures can be presented for the information of the hospital staff.

Central rehabilitation office. The provision of a central rehabilitation office, either in the hospital, or in the community, to which a physician can direct his requests for social or vocational services has many advantages. In Essex County, Ontario, initiative in establishing such an office was taken by the local medical association which appointed a rehabilitation sub-committee, which in turn, together with representatives of many community agencies, established

a community rehabilitation committee. This committee, after consultation with the provincial government, became an incorporated body, gained financial support through the community fund and established an office with a part-time secretary in June, 1955. The office has been fulfilling planning, co-ordinating and individual service functions successfully for the past two years.

Convalescent and chronic disease facilities. Community planning is the essence in creating such facilities. Emphasis must be placed on harmonious and continuous liaison between personnel and professional staffs in general hospitals and with the social and vocational and recreational facilities in the community.

SUMMARY

Problems in creating rehabilitation services in a general hospital are discussed. The author suggests a round table discussion for agreement on terminology, the formation of a department of physical medicine, and the appointment of a director who will educate key hospital personnel on rehabilitation topics, and the medical, nursing and ancillary staff on the functions of the physical medicine department and its relationship to the total rehabilitation of the patient. There should be a community rehabilitation committee and a central rehabilitation office. Planning for orderly development can thus be centralized, and social and vocational rehabilitation facilities can be routed via this central office to the hospitalized patient at the request of his physician.

RÉSUMÉ

L'on discute ici les problèmes de l'établissement de services de réhabilitation dans l'hôpital général. L'auteur suggère une réunion paritaire pour tomber d'accord sur la terminologie. Il propose un département de la médecine physique sous un administrateur; celui-ci instruirait d'abord le personnel en chef de l'hôpital en matière de réhabilitation, ensuite les médecins, infirmières et personnel ancillaire à l'égard des fonctions du nouveau département et de son rapport à l'entièvre réhabilitation du malade. Il faudra une commission publique de réhabilitation avec un bureau central. Ainsi pourra-t-on centraliser les plans pour un développement ordonné, tout en coordonnant par l'entremise de ce bureau les différentes facilités sociales et professionnelles de réhabilitation au service du malade infirme, au gré de son médecin.

The British Columbia Department of Health and Welfare¹

G. F. AMYOT², M.D., D.P.H., and R.D. DEFRIES,³ M.D., D.P.H.

BRITISH COLUMBIA AS A PROVINCE

BRITISH COLUMBIA, the most westerly province in Canada, has an area of 366,255 square miles and is the third largest of the ten provinces, exceeded only by Ontario and Quebec. Much of the surface of British Columbia is rugged plateau or mountain range. British Columbia depends on the development of rich natural resources for its prosperity. One-third of the total provincial net value production comes from its forests, mines, agriculture, water power and fisheries. Almost half of the total production is contributed by manufacturing and about one-fifth by the construction industry.

British Columbia's population is highly urbanized. There are two great concentrations of population, namely, the metropolitan areas of Vancouver and Victoria which contain 55% of the province's total population of 1,544,000 (1958 estimate). Smaller concentrations are found at widely scattered points throughout the Interior and on Vancouver Island. The population of the Interior is almost entirely in the southern half of the province, in valleys of the larger drainage systems and in areas contiguous to them. At the time of the last census, 68% of the inhabitants lived in towns and cities and only a small proportion of rural dwellers was actually engaged in agricultural pursuits. Rapidly developing tertiary industries, such as services, trade, transportation and finance employ more than one-half of the total working population.

The birth rate for 1957 was 26.1 (Canada 28.3) and the death rate 9.2 (Canada 8.2) per 1,000 population. The infant mortality rate was 28 per 1,000 live births (Canada 31) and the maternal mortality rate was 0.4 per 1,000 live births (Canada 0.5).

The provincial budget for the fiscal year 1958-1959 has been set at slightly over \$284,000,000. Net expenditures by the province for health and welfare services are estimated at \$67,500,000 covering services provided by the Health Branch, Social Welfare Branch and British Columbia Hospital Insurance Service of the Department of Health and Welfare and by the Mental Health Services.

¹One of a series presenting the development and organization of public health in each of the provinces and the Department of National Health and Welfare of Canada.

²Deputy Minister of Health of British Columbia.

³Director Emeritus and Consultant, Connaught Medical Research Laboratories.

HISTORICAL HIGHLIGHTS

1869—An ordinance was passed for the promotion of public health in the colony of British Columbia, making provision for the appointment of a medical officer of health during any epidemic.

1871—British Columbia became a province.

1872—An act was passed respecting registration of births, deaths and marriages under the Registrar General of Titles and the administration of vital statistics continued in this office until 1911.

1885—Completion of the transcontinental railroad; many Chinese were brought as labourers.

1892—Serious outbreak of smallpox occasioned the appointment of a provincial health officer. Dr. J. C. Davie was appointed.

1893—Existing health legislation was replaced with a new public health act providing for the appointment of a provincial board of health consisting of Dr. J. C. Davie, Chairman, Dr. J. M. LeFevre, Dr. R. E. Walker, Dr. L. T. Davis and Dr. A. T. Watt (secretary), and the organization of local boards of health.

1896—Serious outbreak of typhoid fever occurred in the Kootenay district and was followed by the appointment of Mr. C. Phillips Woolley as provincial sanitary inspector.

1899—Public Health Act was amended to provide that the Provincial Board of Health should consist of the Lieutenant-Governor-in-Council, i.e., the premier and his ministers, and the appointment of the secretary, Dr. C. J. Fagan was made permanent. Dr. Fagan led in the movement for the control of tuberculosis and the organization of the anti-tuberculosis society. The first sanatorium (Tranquille) was built near Kamloops in 1907.

1906—Provincial Board of Health was transferred from the Attorney-General's Department to the Department of Agriculture. One year later, it was transferred to the Department of the Provincial Secretary under Dr. Henry Esson Young, Minister of Education and Provincial Secretary.

1910—First real advance in public health administration was the passing of an act to provide for medical inspection of children in schools throughout British Columbia.

1911—Office of the Registrar of Births, Deaths and Marriages was created and in 1913 the Secretary of the Provincial Board became executive officer.

1913—A provincial diagnostic laboratory was opened in Victoria but its operation was suspended during World War I.

1916—Dr. Young was appointed Secretary of the Provincial Board of Health, Registrar-General of Births, Deaths and Marriages and Provincial Health Officer serving until his death in 1939. He is remembered as the "father of public health in British Columbia".

1917—First public health nurse was appointed at Saanich.

1919—First course in public health nursing in Canada leading to a university degree or diploma was introduced in the University of British Columbia.

An act for the suppression of venereal diseases was passed.

1921—First health unit in Canada was established in Saanich at the War Memorial Health Centre.

Tranquille Sanatorium was taken over by the provincial government and in 1923 a tuberculosis control program with a travelling diagnostician (Dr. W. S. Lamb) was established.

1922—Provincial laboratories services in the Vancouver area were established by contract with the Vancouver General Hospital laboratory under Dr. R. H. Mullin. In 1931, the Provincial Laboratory was re-established in its own quarters under the direction of Dr. H. W. Hill.

1929—The second health unit in British Columbia was established at Kelowna.

1930—Third full-time health unit at North Vancouver with Dr. G. F. Amyot as director was organized.

1935—Dr. C. E. Dolman succeeded Dr. Hill as director of the Provincial Laboratory.

The Western Division of the Connaught Medical Research Laboratories of the University of Toronto was established in association with the Provincial Laboratory.

The fourth full-time health unit was established in the Peace River district.

Dr. W. H. Hatfield was appointed Director of Tuberculosis Control.

1936—Hon. G. M. Weir was appointed Provincial Secretary and Dr. G. F. Amyot Assistant Provincial Health Officer.

The Greater Vancouver Metropolitan Health Committee was organized to bring together six independent health departments, five school medical services, and the medical services of the University of British Columbia in a Union Health Department.

A new tuberculosis hospital was opened in Vancouver (present Willow Chest Center). Mobile X-ray surveys were commenced in industries and in 1944 in the rural and urban areas.

1939—Dr. H. E. Young, Provincial Health Officer, died, having served in public life with great distinction for more than 40 years.

1940—Dr. G. F. Amyot was appointed Provincial Health Officer.

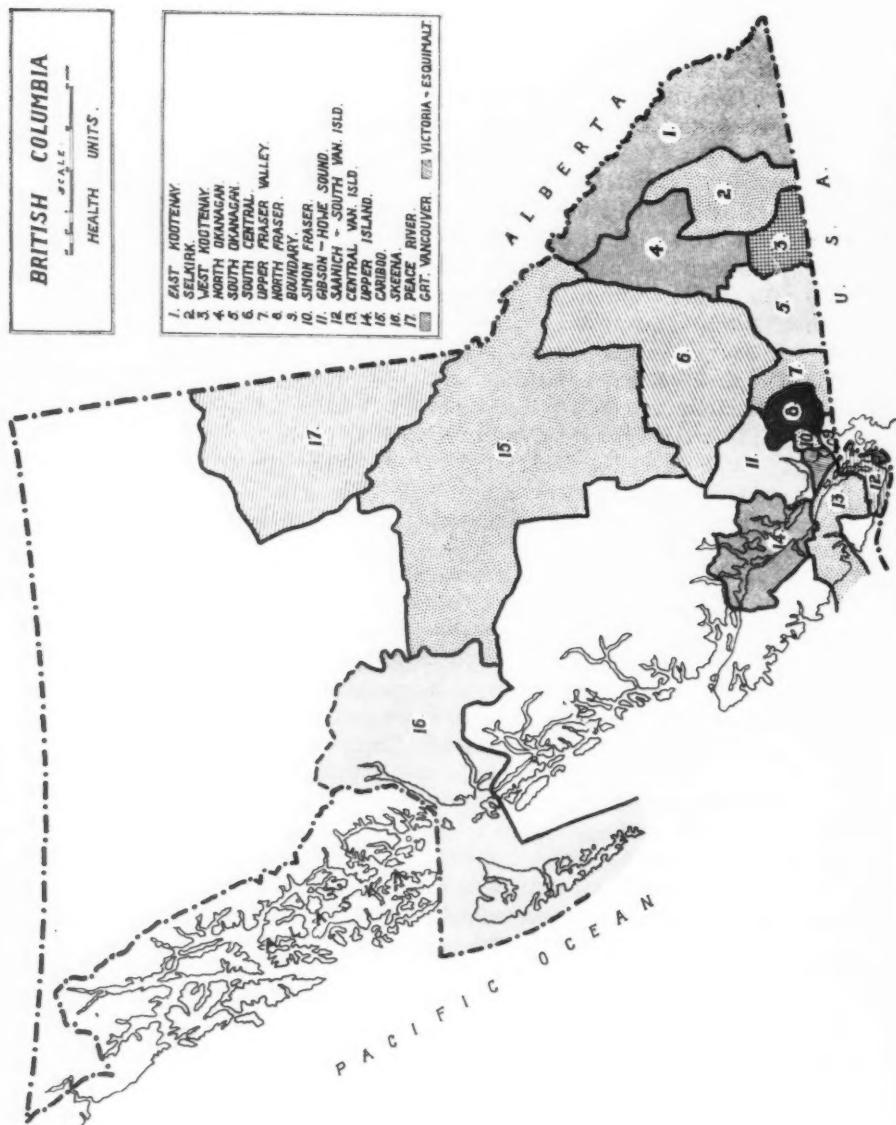
First provincial public health engineer was appointed.

1942—The Skeena Health Unit at Prince Rupert was opened, followed by the Central Vancouver Island Health Unit in 1943, and the North Okanagan Health Unit in 1944.

1946—The Department of Health and Welfare Act was passed replacing the Provincial Board of Health with the Department of Health and Welfare.

All health activities, with the exception of mental health services, were transferred from the Department of the Provincial Secretary to the Department of Health and Welfare.

Hon. G. S. Pearson was named Minister of Health and Welfare and



Dr. G. F. Amyot became Deputy Minister of Health and Provincial Health Officer.

1947—East Kootenay Health Unit at Cranbrook opened.

1948—Devastating floods occurred in the Fraser River and Columbia River valleys.

Cariboo Health Unit with headquarters in Prince George was opened.

1949—Three additional health units, the Upper Island, Upper Fraser Valley and North Fraser Valley were established.

British Columbia Hospital Insurance Service was inaugurated under a Commissioner of Hospital Insurance as a branch of the Department of Health and Welfare.

Enlarged program in preventive dentistry was inaugurated with a full-time director.

1950—The Simon Fraser Unit at New Westminster and the West Kootenay Health Unit at Trail were opened.

Medical faculty was established at the University of British Columbia.

Hon. A. D. Turnbull was appointed Minister of Health and Welfare.

1952—Hon. Eric Martin was appointed Minister of Health and Welfare.

Pearson Tuberculosis Hospital was opened in Vancouver.

The South Central Health Unit at Kamloops and the Boundary Health unit with headquarters at Cloverdale were established.

1953—Sixteenth health unit (Selkirk) was opened, with headquarters at Nelson.

1955—Provincial Health Building was opened in Vancouver accommodating the divisions of the Bureau of Special Preventive and Treatment Services, and other Health Branch services in the Vancouver area.

1958—Tranquille Sanatorium, no longer required for tuberculosis hospitalization, transferred to Mental Health Services as a school for mental defectives.

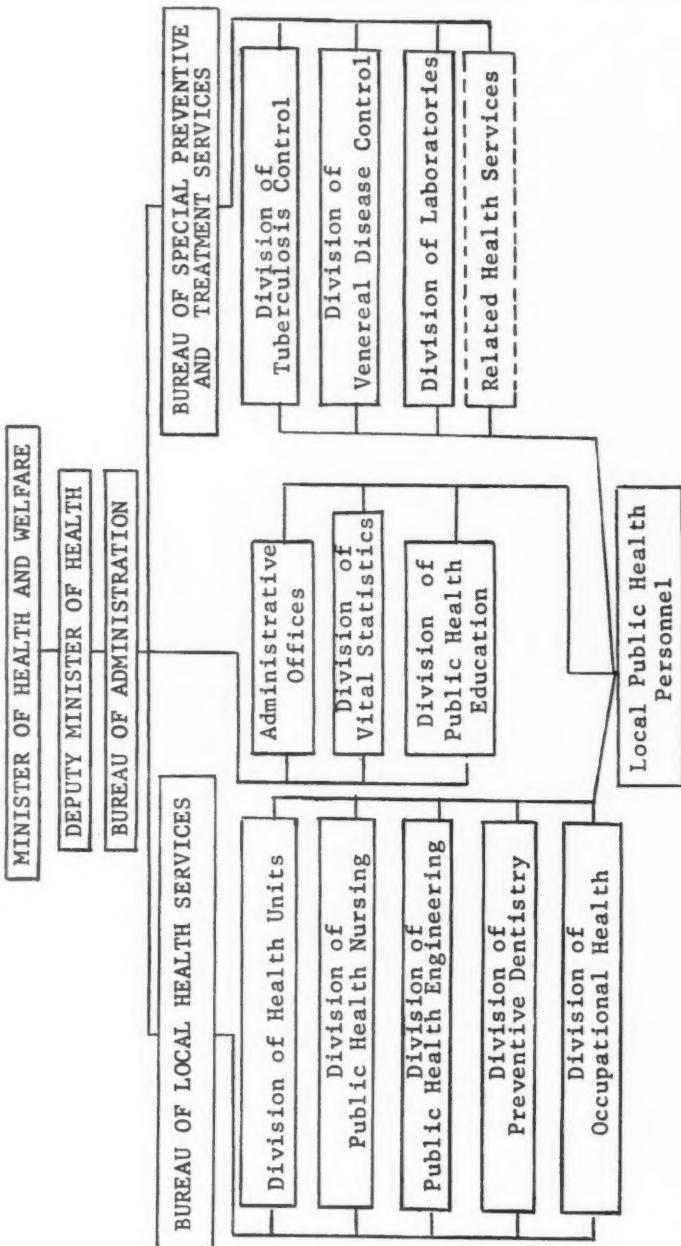
PROVINCIAL HEALTH AND WELFARE SERVICES

The Minister of Health and Welfare is responsible to the people through the Cabinet and the Legislative Assembly for program services conducted by the three branches of the Department of Health and Welfare. The three branches of the department are Health, Welfare and the Hospital Insurance Service. Mental health services are provided in the Provincial Secretary's office having been continued in that department when the Department of Health and Welfare was established in 1946. The British Columbia Hospital Insurance Service was established in 1949 in the Department of Health and Welfare and is directed by a commissioner of hospital insurance who is directly responsible to the Minister of Health and Welfare.

HEALTH BRANCH

The Deputy Minister of Health is responsible for carrying out the health policies set by the Minister and the Cabinet. For ease of administration the Health Branch services are grouped under three bureaux. The headquarters

ADMINISTRATIVE CHART
Health Branch--Department of Health and Welfare



of the department are in the Parliament Buildings, Victoria, with the Bureau of Administration under the director of administration, the Bureau of Local Health Services directed by the deputy provincial health officer and with headquarters in Vancouver, the Bureau of Special Preventive and Treatment Services with the assistant provincial health officer as director. The Vancouver headquarters are located in the Provincial Health Building which was erected in 1955. The deputy minister and the three bureau directors form the central policy-making and planning group of the Health Branch.

BUREAU OF ADMINISTRATION

This bureau is concerned with all major phases of management. Within this bureau are the central office, the division of vital statistics, and the division of public health education. The latter two divisions are included in the bureau because, like the central office, they provide service to the entire health branch. *Central Office.* Among the major responsibilities are personnel administration, records, supplies, agreements with other provinces and agencies, building projects, and certain aspects of the National Health Grants program.

Division of Vital Statistics. This division has a dual function. It administers the various statutes concerning the registration of births, deaths, marriages, divorce orders, adoption orders, and, in addition, it performs statistical analyses to aid in the planning of health programs. The consolidation of these functions gives a more closely integrated service than is found in most other provinces where the two functions are often separate.

The Vital Statistics Act requires that all births, deaths, and marriages be registered with a district registrar who then forwards the information to the central office in Victoria. To facilitate registration, the province is divided into seventy-three districts, each having at least one district registrar. Many of the district registrars are government agents or constables of the Royal Canadian Mounted Police. In addition, the Marriage Act, regulating the licensing of marriage commissioners and the registration of ministers, the Change of Name Act, and the portion of the Wills Act dealing with the registration of notice of filing of wills are administered by this division.

As the statistical workshop of the Health Branch, the division has two basic responsibilities. The division assists in determining the nature and extent of public health needs, and it evaluates statistically the effectiveness of the services intended to meet these needs.

Division of Public Health Education. Professional advice and assistance to local public health personnel and the staffs of other divisions in the planning and conduct of health education programs are provided by the division of public health education. The division makes its services available to other government departments and voluntary agencies. Most of the educational material distributed by the Health Branch is edited and often written by the staff of this division. Included in the publications is the monthly staff newsletter, "Public Health News and Views".

The division maintains a central library of public health texts, journals, films, and film strips, which are used extensively by public health personnel

in all parts of the province, and supervises the selection of material for libraries in health units. Pre-service and in-service training programs for public health staff are arranged and supervised by the division.

BUREAU OF LOCAL HEALTH SERVICES

The bureau includes the divisions of health units, public health nursing, public health engineering, preventive dentistry, and occupational health. It is designed to co-ordinate the services provided to health units. A planning committee, or local health services council, meets weekly for this purpose, and it consists of representatives of each of the bureau's divisions and services under the chairmanship of the deputy provincial health officer.

Personnel of the bureau as well as other senior officers of the Health Branch participate actively in the semi-annual meetings of health unit directors and senior medical health officers of the metropolitan areas. These meetings provide opportunities for review, modification and formulation of policies and programs.

Division of Health Units. The development of local public health programs, through the formation of health units to serve all populated areas of the province, is the responsibility of this division. Under authority of the Health Act, several organized municipal governments and school boards may unite their local boards of health to form a union board of health which will provide all community and school health services through a health unit.

The population of British Columbia is 1,544,000 (1958 estimate). Approximately half (55%) of the population lives in the metropolitan areas of Greater Vancouver and Victoria-Esquimalt, which have their own city health departments. The former is divided into eight health units and the latter comprises one unit. Although the activities and programs of these metropolitan services are closely co-ordinated with those of the provincial service, they do not come under the direct jurisdiction of the Health Branch.

Outside the boundaries of Greater Vancouver and Victoria-Esquimalt, the province is served by sixteen health units, to which the Health Branch, through the division of health units, provides direct guidance and consultative service. Each of these sixteen units is, in effect, a modern local health department staffed by full-time public health-trained personnel serving one or more population centers and the rural areas adjacent to them. At the present time, full-time health services are available to virtually 100 per cent of the population. To simplify the collection of local financial contributions, the geographical area covered by each health unit encompasses two or more school districts which serve as the local "tax-collecting" agencies. However, it should be understood that school health services are only a part of the total program. A fixed annual assessment of 30 cents per capita is collected as the local contribution, and the difference between this and the actual operating cost is borne by the provincial Health Branch.

Each Union Board of Health, composed of representatives of the participating municipalities and school boards, meets several times a year. The director of the health unit, who is the local medical health officer, acts as secretary of the board.

Professional, technical, and clerical staff of the rural health units are employed as provincial government civil servants in order that there may be uniform personnel policies throughout the local health services. However, appointments and transfers are subject to the approval of the Union Board of Health and, for all practical purposes of day-to-day administration and operation, staff are considered as locally employed personnel. The direct administration of the local services is the responsibility of the director of the health unit who is assisted by several public health nurses, one or more sanitary inspectors, one or more statistical clerks, and in most units, by a regional dental consultant.

Division of Public Health Nursing. In the development of health services throughout the province, public health nurses have usually been the first full-time personnel to serve in any area. In introducing the public health program they have been the pioneers building the foundations of health units.

Serving the 16 rural health units there are 180 public health nurses. The director of the division and the staff of consultants at provincial headquarters are responsible for the recruitment and, through the health unit directors, the technical supervision of the nursing staff of local health units.

Division of Preventive Dentistry. The development of community dental health education and the dental rehabilitation of younger children are the main objectives of this division. To achieve these goals, regional dental consultants have been appointed and community preventive dental clinics established. However, all dental health programs are primarily the responsibility of local health unit personnel.

Preventive dental clinics are organized by a sponsoring agency within a community utilizing local dental practitioners. These dentists provide on a part-time basis in their own offices treatment and chairside education to children and parents. These programs are directed primarily at the pre-school and grade I levels. In some areas, service is extended to grade II and III children.

Following approval of this program, the local sponsoring agency, which may be a school board or an organization such as a parent teacher association, is eligible to claim from the Health Branch up to 50% of the cost of dental services provided.

Regional dental consultants are appointed to assist health unit directors both in the efficient administration of community preventive dental clinics and in the planning and carrying out of community dental health programs. Each consultant serves three or four adjacent health units. Other programs are planned to meet the requirements of remote areas. For example, when there is no resident dentist in a particular area, portable equipment may be placed on loan to a visiting dentist if he agrees to devote a specified portion of his time to a previously and locally organized community preventive dental clinic.

Division of Public Health Engineering. The responsibility of this division relates to all matters requiring public health engineering knowledge and procedures. These include community water supplies, sewage disposal systems and treatment plants, stream-pollution, and sanitation of swimming pools, beaches and shell-fish beds.

Under the Health Act communities which plan to install public water supply or sewage systems or to extend or modify existing systems must first obtain the approval of the deputy minister of health. Plans for such construction are reviewed by the division of public health engineering which then advises the deputy minister with respect to their acceptability. Like the staffs of other divisions, public health engineers serve as consultants to health unit directors whenever their specialized training is required to assist in solving local problems.

Division of Occupational Health. The program of this division is concerned primarily with industrial hygiene and closely related problems of adult health. The public health aspects of the provincial civil defence program are co-ordinated by the director of this division.

BUREAU OF SPECIAL PREVENTIVE AND TREATMENT SERVICES

This bureau is located in Vancouver in the new Provincial Health Building. The bureau consists of the divisions of laboratories, tuberculosis control, and venereal disease control which provide specialized and closely related programs of prevention and treatment. For these reasons, they are grouped in the bureau of special preventive and treatment services with the assistant provincial health officer as bureau director. In addition to being responsible for co-ordinating the activities of the three divisions with those of other Health Branch services, the assistant provincial health officer also serves as the deputy minister's representative in Vancouver and the lower mainland. In this capacity, he is able to give advice and guidance to non-government agencies conducting health programs which are officially recognized and at least partially financed by the provincial government. Included among such agencies are the British Columbia Cancer Institute, the British Columbia Division of the Canadian Arthritis and Rheumatism Society, and the G.F. Strong Rehabilitation Centre.

Division of Laboratories. Public health laboratory services are provided, free of charge, by this division through a central public health laboratory in Vancouver situated in the Provincial Health Building and two branch laboratories. These are situated at Nelson and Victoria. The division performs all types of public health laboratory procedures, with the more complex tests being undertaken in the main laboratory. Biological products are distributed free of charge to health units and, through the health units, to private physicians.

Division of Tuberculosis Control. In its program for the diagnosis, treatment, and control of tuberculosis, the division operates and maintains tuberculosis hospitals in Vancouver. The division provides diagnostic and treatment clinics, both stationary and mobile and survey clinics which use miniature-film equipment. The program is conducted in close co-operation with local health services whose staff arrange the schedules of travelling clinics, receive reports of diagnostic findings for residents of the local areas and assist in making arrangements for further care by private physicians. Services are maintained for chest X-ray of patients on admission to hospitals and also out-patients in general hospitals. Social workers of the welfare branch are assigned to the division of tuberculosis control to work in the various institutions. In their

duties with respect to patients and families of patients, they function through social service staffs located in the areas of residence.

The British Columbia Tuberculosis Society, a voluntary organization, has always operated in close co-operation with the division. The society accepts large responsibilities in undertaking much of the publicity and in producing educational materials on tuberculosis. Through the "Christmas Seal" campaigns, it raises funds which are donated to local areas and the division of tuberculosis control for special projects, including the purchase of equipment and construction of buildings.

Division of Venereal Disease Control. This division operates full-time in Vancouver and has part-time clinics at other centers throughout the province. These clinics provide diagnostic and treatment services without cost to the patient. In areas where there are no clinics, the division makes payments to private physicians for the examination and treatment of indigent patients. Through the director of the health unit in each area, the division provides drugs and consultative services to private physicians for the adequate treatment of all patients. Laboratory procedures and tests for venereal diseases are performed by the division of laboratories.

SOCIAL WELFARE BRANCH

For purposes of administration, the province is divided into seven regions. Different types of assistance are provided including that for the aged, the blind, the disabled and the needy subject to the requirements relating to each. These include old age security, paid by the federal government to everyone seventy years of age and over; family allowances; old age assistance paid to those between 65 and 69 who can qualify; blind person's allowance and disabled person's allowance. The last three are shared by the province. It also provides a wide range of health services to any allowance recipient who is financially eligible for supplementary assistance. This includes free medical care and drugs.

Medical Care Provision. Medical, surgical, drug and certain optical and dental services are provided by the province to all persons and their dependents who receive one of the basic allowances and, in addition, supplementary assistance, provided they can qualify under an eligibility test. A subsidiary agency of the British Columbia College of Physicians and Surgeons supplies medical and surgical services in return for per capita payment by the province. The medical services division of the Welfare Branch, Department of Health and Welfare, administers the provision of drug and optical services, dental care and other auxiliary services. The municipalities contribute 15% of the cost incurred by municipal residents. Hospitalization costs are met by the British Columbia Hospital Insurance Service.

BRITISH COLUMBIA HOSPITAL INSURANCE SERVICE BRANCH

Standard ward hospital care on a province-wide basis is provided at a dollar a day cost to the patient through the British Columbia Hospital Insurance Service directed by a commissioner who reports directly to the minister of health and welfare. This service was commenced January 1, 1949 to provide

protection against the cost of acute hospital care. Government funds for the operation of all provincial government health and welfare services as well as the British Columbia Insurance Service are provided by a 5% social services tax (sales tax), and "dollar-a-day" co-insurance charges to patients. All aspects of the provincial hospital construction grants, consultation, inspection and payments to hospitals for services on behalf of the beneficiaries, at all-inclusive per diem rates, are centered in the insurance service which has its headquarters in Victoria.

In-patients benefits include standard ward accommodation and all other available hospital services. A qualified resident (one who has lived continuously in the province for three months) pays \$1.00 for each day that he receives in-patient benefit in British Columbia hospitals. In addition, certain emergency benefits on an out-patient basis are provided for which hospitals charge \$2.00 for each visit. The balance of the cost is paid by the British Columbia Hospital Insurance Service. In addition, the service pays for half of the approved cost of acute and chronic hospital construction, one-third of the approved cost of hospital renovations and of most hospital equipment, and it provides specialized services to the hospitals and communities to ensure the highest possible standard of hospital care.

Municipalities of British Columbia have certain financial responsibilities for medical and hospital care, although these problems are administered at the provincial level. They are required to contribute 15% of the cost for hospitalization of tuberculosis patients who are residents of organized territory and unable to pay and 15% of the cost of the medical care for public assistance recipients who are residents of organized territories.

MENTAL HEALTH SERVICES

In 1946, with the establishing of the Department of Health and Welfare, all health activities with the exception of mental health services were transferred from the Department of the Provincial Secretary. The Provincial Mental Hospital and the associated Crease Clinic of Psychological Medicine are located at Essondale, with more than 3,500 patients. The Woodlands School, New Westminster, is for the training of mentally defective children and accommodates over 1,200. The Provincial Mental Home at Colquitz provides care for selected male patients transferred from Essondale. In the care of the aged, the Geriatric Division provides three homes located at Vernon, Port Coquitlam and Terrace for over one thousand persons. Travelling teams from the Child Guidance Clinics in Victoria and Vancouver periodically visit major centers throughout the province. In 1957, the newest unit of the provincial mental health services, the Mental Health Center in North Burnaby was opened under the Provincial Health Centres Act. The center aims at treating emotionally disturbed adults in an early stage of their illness. It provides after-care of certain patients previously under treatment in other mental health services.

VOLUNTARY HEALTH AGENCIES

In the large field of public health endeavour, not all services are provided by provincial or municipal authorities. The important and well-established voluntary agencies have appointed Health Branch representatives to their governing bodies. Such representation has done much to produce balanced programs and to eliminate duplication of services. Because of their important place in the field of public health, some voluntary agencies receive substantial grants from the Health Branch.

Provision is made for the treatment and control of cancer. This includes a treatment center and a nursing home in Vancouver, consultative clinics located throughout the province and a free province-wide biopsy service. These are the responsibility of the British Columbia Cancer Foundation acting as official agent for the province. The province subsidizes the Foundation, as well as other agencies concerned with specific problems, e.g., Alcoholism Foundation of British Columbia, the Canadian Arthritis and Rheumatism Society (British Columbia Division), the G.F. Strong Rehabilitation Centre and the Canadian Red Cross Transfusion Service.

Rehabilitation facilities extensively developed by voluntary organizations are co-ordinated and assisted through the Health Branch. The G.F. Strong Rehabilitation Centre operates an in- and out-patient center for severely disabled adults, children suffering from conditions such as paraplegia, poliomyelitis and cerebral palsy. Groups such as the Alcoholism Foundation, the Arthritis and Rheumatism Society and the Cerebral Palsy Association are developing out-patient services for specific disabilities and various hospitals offer rehabilitation services to physically disabled children and adults. The British Columbia Workmen's Compensation Board operates a large out-patient rehabilitation center.

METROPOLITAN HEALTH DEPARTMENTS

Greater Vancouver and Victoria-Esquimalt operate their own large city Health departments which are not under the jurisdiction of the provincial Health Branch. Employment of personnel and the appropriation of funds to finance the services are the direct responsibility of the city authorities. There is a very high degree of co-operation in planning and co-ordination of services with the provincial Health Branch which makes annual grants to these two health departments. The provincial Health Branch also makes available consultative, advisory, and other services, including those of the divisions of laboratories, tuberculosis control, and venereal disease control.

Diet and Dental Health in Newfoundland Children¹

TUNG YU LIN, B.Sc., M.A.² and M. DOREEN SMITH, M.A., Ph.D.³

THREE is some evidence in dental literature that a strong association exists between the nature of the diet consumed and susceptibility of the individual to dental caries. Various types of surveys made on a wide selection of populations suggest the relationship. These have been reviewed from time to time, one of the most recent is by Shaw (1). The surveys were based mostly on a comparison of dental caries incidence between two populations having different dietary habits or different degrees of civilization. In addition, experiments have been conducted with growing animals and children to study the effect on teeth of various vitamins, trace elements, etc. Certain minerals such as fluorine, calcium and phosphorus are considered to be beneficial for the structure of the teeth; proteins and vitamins A, C and D are also believed to have value in this respect. Although there is no conclusive or adequate evidence to show that any of the above nutrients except vitamin D (2) and fluorine (3), (4) would reduce susceptibility to dental caries, there does appear to be some interrelationship between the various dietary factors that plays a part in good dental health. On the other hand, it has been demonstrated and is now well established that carbohydrate in the diet can be related to increased dental caries, especially if it is in a sticky form as is the case with some "sweets" and cereals, or is taken between meals (5).

While the actual cause or causes of dental caries and the effective methods of prevention are still questionable, it may be speculated that a tooth of high resistance should be well-calcified and have good structure and that such a tooth must be formed under good nutritional conditions. A dietary regime inadequate in one or more nutrients during the period of tooth formation must be one of the many factors responsible for the occurrence of dental caries. The report presented here is made from a study of the relationship between nutritional background and dental caries based on data obtained from Newfoundland children. The subjects were particularly suitable since due to their isolation from urban centers no dental treatment had been given and very little health education had been available before the period of this survey.

Source of Data

A batch of special dental charts with both dental and dietary records on them was loaned through the courtesy of Dr. R. M. Grainger, Dental Statistics and Research Division of Medical Research, Department of Health, Ontario.

(1) Research project aided in part by a grant from the Nellie Lyle Pattinson Fund.

(2) Research Assistant, Department of Food Chemistry, University of Toronto.

(3) Professor of Food Chemistry, Department of Food Chemistry, University of Toronto.

These charts were recorded by Dr. K. Pownall when he was sent by the National Junior Red Cross during the summer of 1951 to give dental treatment to the children living in the remote northern regions of Newfoundland.

About 400 children received dental examinations and treatments. Their dental caries were carefully recorded at the time the treatment was given and dietary information about the families of these children was noted in detail. Dietary information was obtained from only 282 children in this group as only this number was accompanied to the clinic by the mother from whom the records were obtained. A small group of these children received dental re-treatment in the summer of 1952 and 1955 and the dental history but not the dietary information was re-entered each time.

Method of Analysis of the Data

The total number of teeth in the mouth, teeth decayed, teeth missing and the number of decayed tooth surfaces was counted and noted on dental charts for each child. For the purpose of our study the incidence of dental caries of the children is expressed as "caries figure" which is the ratio of caries to the total number of teeth in the mouth, i.e., the average number of decayed tooth surfaces per tooth.

The dietary information of the families of the children as given by the mothers is noted for each factor consumed as "daily," "frequently," "irregularly," "seldom" or "never" under the following headings: breast feeding, weaning formula, vitamin C supplement, vitamin D supplement, milk, citrus fruits, other fruits, vegetables, potatoes, meat, liver, fish, eggs, bread, cereal, cheese, pastry and candy. In order to compare the nutrition among these children their dietary intake is scored according to the points given for their diet (Table I). Every child was weaned on evaporated milk and all of them had potatoes, cereals and home-made bread daily, therefore no points were given for these nutrients which were common to all. The arbitrary points were

TABLE I—NUTRITION SCORE

Item Consumed	Nutrition Points		
	Never	Irregularly or Seldom	Frequently or Daily
Milk	0	2	4
Vitamin C supplement	0	1	2
Vitamin D supplement	0	1	2
Citrus fruits	0	1	2
Other fruits	0	1	2
Vegetables	0	1	2
Meat	0	1	2
Liver	0	1	2
Fish	0	1	2
Eggs	0	1	2
Cheese	0	1	2
Pastry	0	-1	-2
Candy	0	-2	-4
Breast feeding	None	6 months or less	7 months or more
	0	1	2

arrived at according to the nutritive value of the diet in relation to dental health. Since milk is the best source of calcium in the diet of the children and therefore is the most important food for children's teeth, the points for milk are higher than others; as pastry and candy encourage the growth of bacteria, the points for pastry are minus two and candy minus four. In this system of scoring, the maximum score is twenty-four and the minimum is minus six.

Results

Among the 282 children aged two to seventeen, there were only 7 caries-free children. Thus the caries incidence was 97.5% and the mean "caries figure" was 0.48. Table II shows the mean "caries figure" for each age group.

TABLE II—DENTAL CARIOS INCIDENCE RELATED TO AGE AND TO NUTRITION OF THE CHILD

Mean "Caries Figure" of Children related to:					
(1) Age			(2) Nutrition		
Age	Number of Children	Mean "Caries Figure"	Nutrition Score	Number of Children	Mean "Caries Figure"
2	3	0.07	0	5	0.51
3	7	0.44	1	3	0.50
4	23	0.46	2	0	—
5	22	0.49	3	9	0.43
6	28	0.51	4	4	0.28
7	27	0.69	5	8	0.49
8	28	0.62	6	12	0.48
9	16	0.65	7	9	0.38
10	25	0.47	8	15	0.38
11	20	0.34	9	13	0.24
12	23	0.34	10	12	0.33
13	17	0.30	11	6	0.55
14	16	0.43	12	16	0.32
15	16	0.27	13	10	0.23
16	7	0.38	14	3	0.19
17	4	0.51	15	3	0.31
Total	282			128	
Mean		0.48		8.2	
* "Caries Figure"—the average number of decayed tooth surfaces per tooth.					

These data indicate that the incidence of dental caries is directly proportional to the age of the tooth. The mean "caries figure" increases from 0.07 for age two to 0.65 for age nine and then drops for children over ten years of age. Most of the teeth of the children from ten to thirteen years old are newly erupted permanent teeth and should have a lower incidence of dental caries.

Excluding figures for children under ten years of age, whose natural loss of teeth will affect the dental "caries figure", a comparison was made of the remaining 128 children aged ten to seventeen, with relation to the nutrition score and the mean "caries figure". These results are also shown in Table II.

Since the number of children in each group with the same nutrition score is too small for a satisfactory statistical comparison, the 128 children were divided into four groups based on the nutrition score. A statistical analysis of the correlation of the nutrition data with the "caries figure" was then made. The results are shown in Table III. A linear relationship between the nutrition

score and the dental "caries figure" can be seen. The linear regression coefficient b equals 0.0166 ± 0.0066 number of decayed surfaces per unit nutrition score which indicates that for every increase of 1.0 unit in the nutrition score there is a drop in the dental "caries figure" of 0.0166. (The significance of b exceeds the 2% level.)

TABLE III—STATISTICAL ANALYSIS OF "CARIOS FIGURE" AND NUTRITION SCORE

Nutrition Score	Nutrition Group	Number of Children	Mean "Caries Figure"
0- 3	Poor	17	0.47 ± 0.07
4- 7	Fair	33	0.43 ± 0.06
8-11	Average	46	0.35 ± 0.04
12-15	Good	32	0.28 ± 0.03
Total		128	

Discussion

Prevalence of nutritional abnormality and widespread dental caries among Newfoundland people have been noted in medical and nutritional surveys. Due to unfavourable climate, insularity, poor economic circumstances or other restrictions in living conditions, the diet of Newfoundland has little variety. It appears that there is a relationship between the high incidence of disease and the nature of the inhabitants' diet. The exact relation of the inadequate diet of Newfoundland to the high dental caries incidence can not be evaluated at present. No comparison of the dental caries incidence of Newfoundland with that of Canada or the U.S.A. can be made as dental care was not available to people living in the remote outposts of the Island. The situation with respect to the children living in these outlying districts was unique in that they had had no knowledge of mouth hygiene and no dental care until the arrival of Dr. Pownall. Thus the only probable factor affecting the dental caries was the diet and the resultant nutritional condition.

The number of children included in this sample is not large and the method of scoring their nutritional status is arbitrary, but there is a distinct difference between the diet of the "good" and "poor" nutrition groups and also the dental "caries figure" between these two groups is distinctly different. From a statistical analysis the data suggest that there is a linear relationship between the dietary habits and the incidence of dental caries of growing children.

ACKNOWLEDGMENTS

The authors wish to express their appreciation to Dr. R. M. Grainger, Dental Statistics and Research, Division of Medical Research, Department of Health, Ontario, for lending the records for analysis and to Mr. D. B. Reid, Assistant professor of Biometrics, University of Toronto, for advice on the statistical techniques.

REFERENCES

1. Shaw, James H.: Ann. N.Y. Acad. Sci., 1955, 60: 733.
2. Mellanby, May and Coumoulos, Helen: Brit. Med. J., 1944, 1: 837.
3. Moulton, F. R. "Dental Caries and Fluorine." Am. Assoc. for the Adv. of Sci., Washington, 1946.
4. Brown, H. K.: J. Can. Dent. Assoc., 1952, 18: 200.
5. Gustafsson, B. E., Quensel, C. E. et al.: Acta. Odont. Scand., 1954, 11: 232.

An Epidemic of Q Fever at Princeville, Quebec¹

YVTAUTAS PAVILANIS,² M.D., LAURENT DUVAL,³ M.D., D.P.H.,
A. ROGER FOLEY,⁴ M.D., Dr.P.H. and MARC L'HEUREUX,⁵ D.V.M.

PRINCEVILLE has a population of about 2,700 and is located approximately 30 miles south of the St. Lawrence River, 60 miles from Quebec City and 110 miles from Montreal. It is in the County of Arthabaska and is served by the county health unit with headquarters at Victoriaville. On April 9, 1956, two Princeville physicians reported by telephone an outbreak of illness at the Co-operative Abattoir. It was first thought to be a salmonella infection but the patients did not respond to antibiotic therapy and, moreover, serum agglutination tests on a dozen blood samples gave inconclusive results. In view of the failure to detect the cause and on account of the seriousness of the situation, the director of the health unit consulted the Provincial Epidemiologist.

Of the 170 employees of the abattoir, about 30 fell ill within a week and many others did not feel well. The general pattern of the outbreak suggested a virus infection. The day after reporting the outbreak the director of the health unit brought samples of the blood of the 14 hospitalized patients to the Virus Laboratory of the Institute of Microbiology and Hygiene of the University of Montreal. A few days later the laboratory reported: 12 samples positive, 1 anti-complementary, and 1 negative to *Coxiella burnetii* antigen. We were thus faced with the first epidemic of Q fever to be reported in Canada.

HISTORY OF Q FEVER

Since the causative agent of Q fever was first described, *Coxiella burnetii* has been shown to be present in many countries in all five continents (1). As early as 1935, Davis and Cox (2) isolated in Montana, U.S.A., a rickettsia which later proved to be identical with *Coxiella burnetii*. During the following years, several epidemics of Q fever were identified in the west and midwest of the United States. The first epidemic in North America was observed in Texas in 1946 (3), and the same year a second epidemic occurred in Chicago (3). In 1947, Young (5) showed that Q fever was endemic in California. Bell, Beck, and Huebner (6) estimated that in the Los Angeles region alone at least 50,000 individuals were infected with *Coxiella burnetii* in the years preceding 1949. Denmark, Finland, Eire, the Netherlands, Norway and Sweden appear to be the only countries free from the disease.

¹This work has been partially aided by a grant from the Ministry of Health of the Province of Quebec (Federal-Provincial Public Health Research Grant).

Contribution de l'Institut de Microbiologie et d'Hygiène de l'Université de Montréal, No. 152.

²Associate Professor, School of Hygiene, Chief, Virus Section, Institute of Microbiology and Hygiene, University of Montreal.

³Director of the Health Unit of Arthabaska, Victoriaville, P.Q.

⁴Professor of Epidemiology, School of Hygiene, University of Montreal, Epidemiologist of the Province of Quebec.

⁵Director of the Food and Meat Division, Ministry of Health of the Province of Quebec.

In the eastern part of North America only a few sporadic cases have been observed: in Pennsylvania in 1949 (7), in Washington in 1950 (8), and in Massachusetts in 1951 (9). In July 1956, for the first time in the Province of Quebec, a clinical case was studied and subsequently reported, by Marc Aurèle, Grégoire and Comeau (10). Such occasional cases are not surprising. Serological studies in the United States have demonstrated the causative agent of Q fever in several of the states, even though there are no known clinical cases. In our own country, Pavilanis, Lépine and Morisset (12) drew attention to the fact that a large proportion of the population of the Province of Quebec has antibodies capable of fixing complement in presence of the specific antigen of Q fever. In 1956, Fiset (12a) confirmed the presence of antibodies in the blood of a certain percentage of the population. In a personal communication to one of the authors in 1957, Fiset added: "To date we have tested over 2,000 samples of serum and we find a much higher percentage of positive serums in the East (about 5% for Quebec, New Brunswick and Nova Scotia) than in the West (about 1% for Manitoba and Alberta)."

EPIDEMIOLOGICAL FINDINGS

Between April 2 and 19, 1956, 62 employees of the Co-operative Abattoir of Princeville had Q fever, representing 36.5% of the total number of workers at the abattoir. The onset of the disease was "explosive" like virus infections but contrary to the latter, the disease was not transmitted from person to person and no cases occurred among the staff of the hospital where a number of cases were treated or in the families of the patients who were treated at home. The disease was strictly limited to employees of the abattoir but was even more selective than this statement would indicate. All employees who worked in the slaughtering department contracted the disease and all the other persons affected regularly entered the slaughter house: carvers, shippers and employees who prepared meat products. There was not a single case among the clerks, office workers or administrative staff.

The case of a female employee who fell ill on March 23 was the object of a special investigation. Though the onset occurred ten days earlier than for the other employees, her symptomatology was similar to that of the patients with Q fever yet she had no contact with the animals on the hoof or after slaughter. Examination of her blood showed it contained no antibodies and the condition was diagnosed as influenza.

CLINICAL DESCRIPTION:

For 5 or 6 days the patient feels vaguely unwell, and then the temperature suddenly rises to 102° to 104°F. This rise in temperature is accompanied by a sensation of chilliness and intense cephalgia: all the patients complain of violent headache with frontal or occipital localization. At the same time, lumbar pains, arthralgias, and myalgias appear; the patient feels very weak, with general aches and pains, and he is prostrated by profuse sweating.

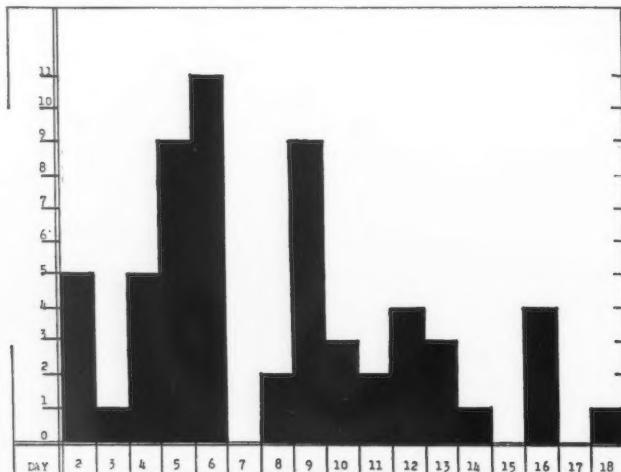
The patient goes to bed for 5 or 6 days when primary atypical pneumonia sets in; cough is light with rather scanty expectoration. This stage is followed by one of marked asthenia lasting a few days. Convalescence extends over several weeks and is marked by persistent weakness. A few employees returned to work after a week's rest but they had to stay at home again after a few days. Though some of the cases were rather severe and complications were noted, there were no deaths.

Urinalysis showed the presence of granular hyaline casts, a trace of blood, and a little albumin. Cytological examination of the blood and cerebrospinal fluid

revealed no abnormalities. Lung X-rays showed a spotty initial infiltration and shadows much more extensive than would have been expected from the clinical picture. Persistence of these X-ray findings was noted long after clinical cure.

The fact is worth mentioning that stethacoustic examination revealed practically no pulmonary signs. In brief, patients with Q fever present the usual symptomatology of virus pneumonia.

Distribution according to date of onset: Onset of the outbreak was sudden: 57% of the patients fell ill during the first week, 34.5% during the second week, and 8.5% during the first three days of the third week. The epidemic lasted 17 days. The alarm felt by the physicians and by the directors of the abattoir at the start of the epidemic is readily understood in view of the rapid and overwhelming onset of the disease. Graph I shows the daily distribution of the number of cases according to the date of onset; distribution was of an explosive nature which suggested a virus infection.



GRAPH I.—Q Fever, Princeville, April 1956. Daily Distribution of Cases.

Distribution according to sex: All the patients were males as there were no females in the slaughtering department or in the other departments where carcasses are handled.

Distribution according to age: This distribution has no epidemiological significance; it corresponds, for the patients, to the age distribution of the employees of the establishment. The youngest patient was 19 years old and the oldest 49.

Distribution according to occupation: Occupation was the determining factor of infection and only individuals who handled meat and viscera contracted the disease. All but one of the 17 men working in the slaughter house became ill with Q fever: there were 9 cases in the carving department, 7 in the shipping, 7 in the prepared meat products department and 5 in the curing

department. The occupations of 15 of the patients were not specified. On the other hand, it was definitely established that there was not a single case among the administrative staff, clerks, office workers, or other employees not called upon to handle meat. The disease is transmitted through animals as vectors of the rickettsia. There was no interhuman infection.

Incubation period: For a time we hoped to determine the incubation period of the disease. We have already mentioned that only one of the men working in the slaughter house (N.B.) remained free from the disease. He had been absent from the abattoir from March 12 to 15; unfortunately, his blood was found to contain antibodies at a titer of 1/64. He had not been ill recently, his antibodies might therefore be evidence of an old infection or of asymptomatic or subclinical Q fever. We were therefore unable to determine the approximate date of contagion or the incubation period of the disease.

POSSIBLE SOURCE OF THE INFECTION

The Co-operative Abattoir of Princeville receives animals from western Canada and from the local market. As there had never been known cases of Q fever in the province it was only human to blame the neighbour instead of admitting we might have been at fault and we therefore began investigating shipments of western cattle.

The incubation period of the disease in man is said to be between 2 and 3 weeks and our first clinical case occurred on April 2; the source of infection had therefore to be sought between March 12 and 25. During that period three shipments of cattle had been received at Princeville, comprising 69 head in all. The first shipment of animals had been received in very poor physical condition and the railway car was repulsively filthy but when the epidemiological investigation was started, the animals of all three shipments had been slaughtered and none of the meat and carcasses remained. It was therefore impossible to make any laboratory tests.

The local medical officer of health reported no incriminating evidence among the human or animal population but it was known that many individuals here in Quebec had Q fever antibodies. It is also admitted that transmission of the etiological agent from person to person has not been established. It was therefore logical to look for the presence of the disease in our own herds.

Two teams were formed by the Meat and Food Inspection Division, Ministry of Health. The first was made up of a veterinarian bacteriologist, a laboratory technician, and a veterinary student who were loaned to the Virus Laboratory of the Institute of Microbiology and Hygiene of the University of Montreal to handle the heavy influx of samples. The second team, which consisted of a veterinarian of our division, the veterinarian of the health unit, and a fourth-year veterinary student, was a flying squad entrusted with the veterinary investigation on the field and the collection of blood, milk, and urine samples from herds from which some animals had been sent to the abattoir during the possible incubation period.

During the month of May the material required by the flying squad was prepared, a list was drawn up of the owners of animals slaughtered at Prince-

ville during the incubation period, and they were contacted. Sampling was started May 28 and ended October 18, 1956, and was divided into two separate stages: during the first, all efforts were concentrated on the possibly incriminated herds; during the second, samples were procured from the most varied sources in the province to try to determine the degree of infection of our livestock.

TABLE I—NUMBER AND ORIGIN OF HERD SAMPLES

Origin of Samples	Number of Samples			Repeats Cattle
	Cattle	Serums	Milk	
Counties of:				
Arthabaska	576	26	15	
Lotbinière	158	4	1	
Nicolet	245	2	3	
Megantic	240	0	0	
Suspicious Area	1,219	32	19	139
Pure-bred cattle:				
Nicolet				
L'Assomption				
Sherbrooke				
Two Mountains				
Miscellaneous origins:				
Eastern Abattoirs, Montreal				
Abitibi		30		
Temiskaming		12		
Perth, Ontario		29		
Princeville Abattoir		11		
TOTAL	1,373	114	19	139

In its investigation of the herds, the flying squad collected a total of 1,645 samples. In addition, some 20 ewe placentas were obtained for the laboratory in the spring of 1957 at the time of lambing. Pause a moment to consider the amount of work accomplished by this squad! After having obtained the names and addresses of the owners of suspicious herds they had to visit each farmer to obtain his permission to take blood samples; they had to locate the herd which sometimes was at a considerable distance from the farmhouse; they had to take, prepare, pack and ship the samples of blood and milk. It was sometimes necessary, at the request of the laboratory, to identify a specific animal from which a second blood sample was required. The work was carried on uninterruptedly in all kinds of weather. We pay tribute to their zeal and devotion which greatly contributed to the success of the present investigation.

LABORATORY METHODS

All the samples were tested in the Virus Laboratory of the Institute of Microbiology and Hygiene of the University of Montreal.

Both human and animal blood samples were collected aseptically and shipped the same day to the laboratory where they were decanted and stored

at 4°C. Milk, urine, and sputum samples were collected in sterile screw-top jars and brought the same day to the laboratory where they were kept frozen.

The Kolmer-Boerner technique was used for the complement-fixation reaction, with incubation overnight at 4°C. Lederle's antigen prepared from the Nine Mile strain was used. The reaction is considered positive when there is no hemolysis, 4+, or only very slight hemolysis, 3+.

The milk, urine, and sputum samples, as well as the ewe placentas, were inoculated into guinea pigs to test for the presence of *Coxiella burnetii*. In this technique, the sample is thawed, 5 cc. are mixed with 200 units of penicillin per cc., and 2 to 4 guinea pigs are inoculated intraperitoneally with 2 cc. of the mixture. The animals are observed for 4 to 6 weeks. Their blood is sampled before inoculation and at the end of the period of observation. The appearance of specific antibodies is taken as evidence of the presence of rickettsia in the material. Six mice are inoculated intraperitoneally with the same samples. Ten days later the animals are sacrificed and spleen smears stained by Macchavia's method are examined histologically.

Detection of Antibodies: We received 43 serums from patients with symptoms attributable to Q fever. The results of the complement fixation reaction with the Nine Mile strain antigen are given in Table II.

TABLE II—ANTIBODY TITER OF THE PATIENTS' SERUMS

Reaction	0	1/4	1/8	1/16	1/32	1/64	1/128	1/256	Total
Number	2	2	1	3	9	11	6	9	43

The complement fixation reaction showed that the majority of patients had a high titer of specific antibodies; 81% had a titer of 1/32 or more. We did not find any high values among 152 normal individuals of the same age whom we tested for *Coxiella burnetii* antibodies (Table IV). For 11 of the 43 patients we received a second serum a month later. Results of the fixation of the complement are given in Table III.

TABLE III—TITER CHANGES IN A FEW PATIENTS

No.	1st Serum	2nd Serum
1	1/4	1/64
2	1/32	1/64
3	1/32	1/64
4	1/32	1/128
5	1/32	1/256
6	1/64	1/32
7	1/64	1/128
8	1/64	1/512
9	1/64	1/512
10	1/64	1/1024
11	1/128	1/256

In the second serum the antibody titer was increased 16-fold in 2 cases, 8-fold in 3 cases, 4-fold in 1 case, and 2-fold in 4 cases; in patient no. 6 the titer decreased. In Q fever, the antibody titer rises for a few months and then

falls rapidly. In one patient we first observed an increase in antibody titer from 1/32 to 1/256, and three months later the titer dropped to 1/64.

For the sake of comparison with the titers found in the patients, 297 individuals from the Montreal region were tested for antibodies. The results are given in Table IV. We did not find any antibodies in infants up to 1 year of age. The antibodies begin to appear during the second year. In the age group one to 14 we found 24 subjects (19.7%) with antibodies. On the other hand, in the age groups of 15 and over, we found very few positive individuals. We believe that the high incidence of antibodies in children may be due to the fact that they may occasionally consume improperly pasteurized milk. We tested unpasteurized milk from 5 Montreal dairies for the causative agent of Q fever, but failed to detect *Coxiella burnetii*.

TABLE IV—ANTIBODY TITER IN A CONTROL POPULATION

Age Group	Number	0	1/4	1/8	1/16	1/32	1/64	1/128	1/256
0-1 year	23	23	—	—	—	—	—	—	—
1-14 years	122	98	7	6	8	3	—	—	—
15-29 years	61	55	6	—	—	—	—	—	—
30-70 years	91	76	11	2	2	—	—	—	—

TESTING CATTLE FOR Q FEVER

It is known that the rickettsia which causes Q fever can infect animals and their excreta, milk, and meat are the sources of the infection in man. We tested cattle from several counties of the Province of Quebec for antibodies. The results are given in Table V.

TABLE V—ANTIBODY TITERS IN BOVINE SERUMS

County	Number	0	1/4	1/8	1/16	1/32	Positive
Nicolet	223	217	3	3	—	—	2.7%
Arthabaska	567	542	19	4	2	—	4.4%
id. pure breeds	63	52	3	7	1	—	17.5%
Lotbinière	157	141	10	1	4	1	9.5%
Mégantic	240	209	18	9	3	1	12.5%
Two Mountains pure breeds	17	13	1	2	1	—	23.5%
Sherbrooke pure breeds	11	6	3	1	1	—	36.4%
L'Assomption pure breeds	63	28	13	14	6	2	55.5%
	1,341	1,208	70 (5.22%)	41 (3.06%)	18 (1.34%)	4 (0.3%)	9.92%
Pure breeds	154	99	20	24	9	2	35.78%
Others	1,187	1,109	50	17	9	2	6.57%

Sheep and goats are more receptive of *Coxiella burnetii* than the bovines and, in infected regions, specific antibodies are found in the blood of the majority of sheep. We tested 91 sheep for antibodies with the following results: 0 titer 37 (41%); 1/4, 21 (23%); 1/8, 29 (32%); 1/16, 4 (4%). A total of 54 sheep (59%) showed Q fever antibodies in their blood.

ISOLATION OF RICKETTSIA

We looked for rickettsia in the blood, milk, and urine of cows with antibodies in their blood, but all tests were negative. We did not succeed in isolating rickettsia from unpasteurized milk in 5 Montreal dairies. On the other hand, we did succeed in isolating *Coxiella burnetii* from 4 different ewe placentas.

TABLE VI—ISOLATION OF COXIELLA BURNETI FROM EWE PLACENTAS

Ewe placenta No.	Fixation of the complement guinea pig serum		Test for Rickettsia in mouse spleen
	I	II	
182	0	1/16	+
184	0	1/256	++
185	0	1/128	++
186	0	1/256	++

VECTORS OF COXIELLA BURNETI IN THE PROVINCE OF QUEBEC

Several arthropods are known which can be vectors of Q fever. We were interested in finding out what vectors could transmit *Coxiella burnetii* from animal to animal. Through the courtesy of Dr. L. Choquette, parasitologist of the Ministry of Health, Quebec, we received 10 samples of *Melophagus ovinus*. This parasite remains on sheep and only accidentally stings other animals or man (15). Since the studies of Nöller, it is known that melophagi are carriers of various rickettsia and nearly 100% are infected with *Rickettsia melophagi* (16). In all 10 samples we found rickettsia by direct examination in the excreta of the melophagi but we found *Coxiella burnetii* in only 4 of the samples. *Coxiella burnetii* was isolated as follows: the melophagi were ground and diluted with normal saline and each sample was inoculated in two guinea pigs. The guinea pigs inoculated with 4 of the samples developed fever within 5-7 days and 6 weeks after inoculation there appeared specific antibodies giving fixation of the complement with Henzerling's strain of Q fever antigen at a titer ranging from 1/8 to 1/256. The guinea pigs inoculated with samples containing *Rickettsia melophagi* did not show any rise in temperature nor development of anti-*Coxiella burnetii* antibodies. Moreover, *Coxiella burnetii* could be differentiated from *Rickettsia melophagi* by inoculation into lice. When inoculated into the coelom of the louse, *Coxiella burnetii* multiplies very readily and can be found in large numbers from the fifth day on. On the other hand, we were unable to culture *Rickettsia melophagi* by this method.

DISCUSSION

The results presented in this study prove that the epidemic which broke out among employees of the Princeville Abattoir was caused by *Coxiella burnetii*. We observed an increase in the titer of specific antibodies in the blood of 10 of the 11 patients tested. On the other hand, on examining 152 normal adults in the Montreal region we found specific antibody titers of: 0 in 82.6%, 1/4 in 7.2%, and 1/8 and 1/16 in only 2.6%. Patients with Q fever, on the contrary, had much higher titers. In this group we found only 4.6% with 0 titer, 4.6% with 1/4, 9.3% with 1/8 and 1/16, and 81.4% with titers greater than 1/16.

In order to determine if Q fever is endemic in the Province of Quebec, we tested cattle and sheep for antibodies. The results showed that 9.9% of the cattle are or have been infected with *Coxiella burnetii*. The incidence of antibodies is 6 times greater in pure-bred herds than in mixed breeds. The percentage of positive animals varies in different counties and we found many more positive subjects in pure-bred herds (35.78%) than in the remainder of the bovine population (6.57%).

Comparing our results with those of Lennette *et al.* (13), the cattle of the Province of Quebec are seen to be as heavily infected as those of California where thousands of human cases have been observed. Lennette tested the serum of 9,423 bovines and found 7% with a titer of 1/8 or more. The incidence of positive tests in the different groups of animals varied from 0.7% to 22.6%. Of the 1,341 bovines which we tested, 4.7% had a titer of 1/8 or more, and the incidence of positive tests in the various groups ranged from 1.3% to 34.9%.

We also found that sheep in the Province of Quebec are more highly infected than in Northern California, even considering that the number of sheep which we tested was not large. Lennette examined 3,938 sheep and found 14% positive. In Quebec, of 91 sheep tested 59% were positive. We fully realize that the number tested is inadequate, and the study is being continued.

Isolation of *Coxiella burnetii* from ewe placentas and from sheep parasites (*Melophagus ovinus*) indicates that Q fever is endemic in the Province of Quebec, but on account of the highly variable symptomatology (14) clinical diagnosis is rather difficult. Detection of specific antibodies or isolation of rickettsia are the only sure means of diagnosis.

SUMMARY

- An epidemic of Q fever occurred at Princeville in April, 1956.
- The disease was of animal origin; there was no transmission from person to person, and only employees handling the carcasses and viscera of the slaughtered animals were infected.
- The cases originated exclusively at the abattoir without any secondary cases in the town.
- The clinical signs are those of an acute respiratory virus infection.
- In order to establish the source of infection two teams were formed, one for the laboratory testing, the other for the veterinary investigation and collection of samples from animals at the farm.
- The laboratory showed by serological tests that the etiological agent responsible for the epidemic was *Coxiella burnetii*.
- The causative agent of Q fever was isolated from 4 samples of ewe placentas.
- 9.9% of the bovine population of the province was found to be or to have been infected with this agent.
- Our sampling showed that 50% of the sheep were or had been infected with this same agent.
- *Melophagus ovinus* is one of the vectors of Q fever in the Province of Quebec.

RÉSUMÉ

- Il est survenu une épidémie de Fièvre Q. à Princeville, en avril 1956.
- La maladie fut d'origine animale: il n'y a pas eu de transmission inter-humaine et seuls les employés manipulant les carcasses et les viscères des bêtes abattues contractèrent l'infection.
- Les cas survinrent seulement à l'Abattoir, sans cas secondaire en ville.
- Les signes cliniques sont ceux d'une infection respiratoire aigüe d'origine virale.
- Dans la recherche de la source d'infection, deux équipes furent formées: l'une pour le travail de laboratoire, l'autre pour l'enquête vétérinaire et le prélèvement d'échantillons sur les animaux de ferme.
- La Laboratoire a prouvé, par les résultats sérologiques, que l'agent étiologique responsable de l'épidémie est le *Coxiella Burnetii*.
- Dans quatre échantillons de placenta de mouton, nous avons isolé l'agent causal de la Fièvre Q.
- Nous avons trouvé que 9.9% des bovidés dans la Province ont eu une expérience immunologique avec cet agent.
- Notre échantillonnage nous donne que 50% des moutons sont ou ont été infectés par ce même agent.
- *Melophagus ovinus* est un des vecteurs de la Fièvre Q. dans la Province de Québec.

BIBLIOGRAPHY

1. Berge, T. O. and Lennette, E. H.: Am. J. Hyg. 1953, 57: 125.
- 1a. Kaplan, M. M. and Bertagna, P.: Bull. Org. Mond. Santé, 1955, 13: 829.
2. Davis, G. E. and Cox, H. R.: Pub. Health Rep. 1938, 38: 2259.
3. Topping, N. H., Shepard, C. C. and Irons, J.V.: J.A.M.A. 1947, 133: 813.
4. Shepard, C. C.: Am. J. Hyg. 1947, 96: 185.
5. Young, F. W.: Calif. Med. 1948, 69: 89.
6. Bell, J. A., Beck, M. D. and Huebner, R. J.: J.A.M.A. 1950, 142: 868.
7. Janton, O. H., Bondi, A. and Sigel, M. M.: Ann. Int. Med. 1949, 30: 180.
8. Sigel, M. M., Scott, T. F., Henle, W. and Janton, O. H.: Am. J. Pub. Health, 1950, 40: 524.
9. Vose, F. P.: New England J. Med. 1951, 244: 288.
10. Marc Aurele, J., Gregoire, F. and Comeau, M.: Canad. M.A.J. 1956, 75: 931.
11. Strauss, E. and Sulkin, W. E.: Am. J. Pub. Health, 1949, 39: 492.
12. Pavilanis, V., Lepine, P. and Morisset, N.: Canad. M.A.J. 1952, 66: 333.
- 12a. Fiset, P. Paper presented at the 1957 Convention of the Canadian Medical Association.
13. Lennette, E. H. et al: Am. J. Hyg. 1951, 54: 1.
14. Clark, W. H. et al: A. M. A. Arch. Int. Med. 1951, 88: 155.
15. Beguaert, J.: Entomol. Americana, 1942, 22: 1.
16. Nöller, W.: Arch. Schiffs und Tropenhyg, 1917, 21: 70.

Canadian Journal of Public Health

EDITORIAL BOARD

R. D. DEFRIES, C.B.E., M.D., D.P.H., LL.D., *Editor*

J. T. PHAIR, M.B., D.P.H., *Associate Editor* CYNTHIA PALMER, B.A., *Editorial Assistant*
Advisory Editorial Board: J. H. BAILLIE, M.D., D.P.H.; GORDON BATES, M.D.; A. E. BERRY,
M.A.Sc., C.E., PH.D.; J. G. CUNNINGHAM, B.A., M.B., D.P.H.; C. E. DOLMAN, M.B., PH.D.,
D.P.H., F.R.C.P., F.R.S.C.; EDNA L. MOORE, REG.N., LL.D.; G. D. PORTER, M.B.; A. H. SELLERS,
B.A., M.D., D.P.H.; F. O. WISHART, M.A., M.D., D.P.H.; J. WYLLIE, M.A., M.D., CH.B., B.Sc., D.P.H.

OUR ANSWER TO OUR ASSOCIATION'S NEED

DURING the past year the present needs of the Association have been studied carefully by a committee under the chairmanship of Dr. K. C. Charron. The committee considered the minimum requirements of the Association to continue its present program and also to extend its work to include new projects such as the provision of a consultative service in the field of health administration and the conduct of surveys for health departments. The report emphasized that the Association required at once increased financial support to maintain the present program. It presented estimates of the budget which would be necessary to support an enlarged program including the appointment of a full-time executive secretary. The Executive Council at the annual meeting in Vancouver last May accepted the report and unanimously approved of calling on our membership for an increased measure of financial support through increasing the membership fee in the national Association to \$5.00. The Association covers the whole of Canada through its branches and divisions or through the provincial health associations. The joint fee for membership with the national Association is in effect in all of these provincial branches or associations.

The financial situation of the Association is urgent. A deficit was reported last year and will again be recorded this year. (The 1957 financial report was published in the June 1958 issue of the Journal.) The Association cannot continue unless these deficits are cleared and increased support is obtained. The Association operates without salaried executive officers. Every economy has been effected but the inevitable increases in the costs of printing and publishing the Journal and of the other activities of the Association necessitate immediate action. The Executive Council believes that our members will meet this need by promptly remitting their membership fees to their provincial associations.

The strength of the Association lies in the interest of each individual member. The Association counts on you!

NEWS NOTES

International

Dr. Abraham Horwitz of Chile was elected director of the Pan American Sanitary Bureau at the fifteenth Pan American Sanitary Conference held in San Juan, Puerto Rico September 21-October 6. Dr. Horwitz will succeed Dr. Fred L. Soper whose third four-year term of office ends January 31, 1959.

Federal

The national advisory committee on the rehabilitation of disabled persons met in Ottawa on October 6-7. The agenda included discussions of vocational training for the handicapped, their employment and medical rehabilitation. The committee includes representatives of voluntary health and welfare agencies, the medical profession, employers, organized labour, the universities, each provincial government, and the federal departments of Labour, National Health and Welfare, and Veterans Affairs.

The sub-committee on alcoholism of the Department of National Health and Welfare's advisory committee on mental health met in Ottawa on October 6.

A technical conference on hospital insurance was held in Ottawa on October 20-21 when various problems, including reciprocal arrangements between provinces participating in the hospital insurance program, were discussed. Prior to the meeting a committee on statistics and accounting met to prepare a report for the conference.

The Defence Research Board has recently established a unit to conduct psychiatric research with defence implications. Set up in Ottawa, the unit is being directed by Dr. F. C. R. Chalke, assisted by a psychological consultant, R. Wendt, M.A., and an executive officer, Major T. Hoy, M.A.

The Canadian and United States sections of the technical advisory board on air pollution to the International Joint Commission met in Ottawa in mid-October and presented their reports to the IJC. The board held both open and executive sessions dealing with the final report to the IJC on the air pollution reference of 1949 in the Windsor-Detroit area and presented a progress report on the voluntary control program established for the emission of smoke from Great Lakes vessels using the Detroit River.

Miss Ethel G. Martens, B.A., B.Ped., M.P.H., formerly with the Manitoba Department of Health and Public Welfare, has been appointed as a health educator in the Indian and northern health services of the Department of National Health and Welfare.

Mrs. Pamela Verdier, M.Sc., has joined the staff of the nutrition division, Department of National Health and Welfare, as a biochemist.

Dr. F. D. Sowby, clinical consultant, radiation services, occupational health division, is now on leave, working on radiobiological studies at the Royal Marsden Hospital, London, England. During his absence his duties have been assumed by Dr. W. J. D. Cooke.

Nova Scotia

The annual staff meeting of the Provincial Department of Health was held on November 17 and 18. Following the staff meeting, those attending remained for the meetings of the Atlantic Branch, C.P.H.A., Nov. 19-21.

R. Donald McKay, Director, Division of Environmental Hygiene, has received the Diploma of the American Academy of Sanitary Engineers. This diploma carries with it certification in the specialty of sanitary engineer-public health.

Mrs. Anna I. Brown, a former Public Health Nurse, has returned to our staff, with headquarters in Pictou.

Miss Lois Robertson, Public Health Nurse who has been working from the Pictou office, for the past few years, has been transferred to the Middleton office in the Fundy Division.

New Brunswick

July 1, 1959 has been selected as the date for the inauguration of the Hospital Care Insurance Plan in New Brunswick. This announcement was made recently by Health and Social Services Minister, Hon. Dr. J. F. McInerney.

Dr. L. E. Bashaw has assumed the position of Medical Director for the Forest Hill Rehabilitation Centre, Fredericton. Dr. Bashaw was formerly with the Compensation Board Rehabilitation Centre at Downsview, Toronto. Other additions to the Centre staff include Eleanor Smith, head

physiotherapist; Judy Taylor, physiotherapist and Joan McGillis, occupational therapist.

Dr. E. O'Rafferty has been appointed District Medical Health Officer for Queens and Sunbury County and replaces Dr. H. L. Logan who has now retired. Dr. O'Rafferty will be located in Sussex.

Health examinations of 570 new student teachers enrolled in the Teachers College were conducted by Dr. Mary Southern-Holt, director of maternal and child health for the province, assisted by eight physicians from the department staff. Preliminary examinations were conducted by public health nurses and dental examinations were made by Dr. R. S. Langstroth, dental health director.

Quebec

L'Institut Supérieur d'Administration Hospitalière of the University of Montreal has been allotted a national health grant of more than \$11,000 in the current fiscal year to help expand its enrolment and thus to provide a continuing supply of French-speaking hospital administrators for Quebec's expanding hospital program.

Ontario

The Ontario Department of Health, the Ontario Medical Association and the Ontario Division of the Junior Red Cross are co-operating in efforts to provide treatment for babies born with hemolytic disease. Centers for investigation and treatment have been established throughout the province. The benefits of this Rh service are made available to all mothers in Ontario.

On October 29 the new rehabilitation center of the Workmen's Compensation Board of Ontario was opened in Toronto by the Hon. Charles Daly, Minister of Labour. The new center is composed of 14 buildings erected at a cost of over \$5,000,000. The buildings are on a 65-acre site and provide treatment facilities for 500 injured. Approximately 4,000 will receive treatment annually at the center. To date, it has been successful in returning 80% of its patients to gainful employment. The new center marks the achievement of 26 years of pioneering in rehabilitating those injured in industrial accidents.

The Hon. Mackinnon Phillips opened a new 500 bed group of buildings at the Ontario Hospital, Kingston on November 26. The buildings consist of an administration, reception and active treatment block with infirmaries for male and female patients and a kitchen and dining hall building.

A Great Lakes water pipeline system to supply the heavily populated areas of Middlesex County, including the city of London, has been recommended by the Ontario Water Resources Commission. The cost is estimated from \$8,000,000 to \$11,000,000. Four possible pipeline routes have been suggested, one from Lake Erie and three from Lake Huron.

School of Hygiene, University of Toronto

A "Breakfast Meeting" of the School Alumni and friends with the President, Dr. J. H. Baillie, in the Chair, was held in the Sheraton-Jefferson Hotel, St. Louis, Mo., October 29 during the American Public Health Association meeting. The Director of the School, Dr. Rhodes, reported on the increased enrolment and the plans for a new course leading to the Diploma in Nutrition. Thirty-two were present including the following: G. F. Amyot; J. H. Baillie; A. R. J. Boyd; A. M. Breuls; M. H. Brown; B. Bucove; R. G. Cadham; E. L. Davey; R. D. Defries; J. Gilbert; D. G. Gill; R. P. Hardman; D. A. Hill; J. E. F. Hastings; R. A. Kennedy; R. M. King; B. D. Layton; J. M. Mather; G. K. Martin; F. McCombie; D. L. MacLean; D. M. McLean; A. J. Rhodes; S. Selvaratnam; P. Sivasothy; A. H. Sellers; C. E. Smith; D. C. Smith; J. F. Webb; J. P. Wells; R. J. Wilson; G. E. Wride.

A revised and expanded program of post-graduate instruction for industrial physicians at the School of Hygiene has been announced. All health problems of the industrial employee will be covered in the course which will prepare physicians for the Diploma in Industrial Health. The course can be taken full-time over one academic year, or part-time over two years.

The W. K. Kellogg Foundation, Battle Creek, Michigan, has provided a grant of \$10,000.00 to the University of Toronto as a perpetual revolving loan fund for post-graduate students in the course in Hospital Administration conducted in the School of Hygiene. The fund will be available at a low interest rate to students in either of their two years of study.

Manitoba

The appointment of Dr. Ralph A. Connor, D.D.P.H. of Grimsby, Ont. has been announced as Director, Bureau of Dental Services, Manitoba Department of Health and Public Welfare. Dr. Connor holds a specialist's certificate in dental public health.

A home care program to improve at a reasonable cost the care of patients with

chronic illnesses is being initiated through the out-patient department of the Winnipeg General Hospital. Financial assistance is being provided through the National Health Grants.

Saskatchewan

The new provincial laboratories building costing \$850,000 was opened in Regina on October 17, 1958. The building is located on the legislative grounds and is connected to the provincial public health building by a tunnel. The building is square in design, the center being devoted to administrative services and the perimeter to laboratories. Through the use of integral insulation an economy was effected in the reduction of the exterior wall thickness from the usual 14 to 16 inches to only 2½ inches. Three mosaic panels in the main entrance lobby, illustrative of microbiology, biochemistry and haematology are distinctive features. The opening ceremonies were conducted by the Hon. J. Walter Erb, minister of public health and Premier T. C. Douglas officially opened the building. The director is Dr. Hugh E. Robertson and Miss Elspeth McNelly is the assistant director with a staff of 46 members. During the year ending April 1958, 191,750 specimens were received in the laboratories.

The Regional Health Services Branch of the Department of Public Health conducted a survey to determine the extent of the vaccination program against poliomyelitis. The data are most encouraging. The total eligible population from infancy to old age is 596,500. Eighty per cent received the first dose, 72% the second dose and 59% the third dose. The highest percentage found was 77% and the lowest excluding the northern health district was 45%. In the age group 0-16 years, of the total eligible population of 305,064 persons, 93%, 88% and 80% received the first, second and third doses respectively. Excluding the northern health district, the lowest and highest percentage recorded in the health regions were 77% and 86%. The adult population, 17-40 years did not respond to the invitation to be vaccinated free of charge as did the younger generation. Out of an eligible population of 291,436, only 66% received the first dose, 57% the second dose and 37% the third dose.

Recently in some health regions intensive canvasses have been made on a house-to-house basis to discover the actual number of persons who have failed to receive the vaccine. Preliminary findings indicate that only about 8% of the people have not received vaccine. The figures presented are for the doses of vaccine given by public

health personnel and do not include the doses given by private physicians.

Public health nursing appointments: Miss Elizabeth Thompson to Moose Jaw Health Region; Miss I. Cudmore and Miss R. McBurney to the Weyburn Health Region; Miss L. J. Marklund, Miss J. E. Roy and Mrs. V. Price to the Prince Albert Health Region.

Miss Louise Miner, President, Saskatchewan Branch C.P.H.A. and Public Health Supervising Nurse, addressed the Ontario Public Health Association's annual meeting in Toronto on the topic "Public Health Nursing Implications of Recent Legislation in the Fields of Hospital Insurance and Home Care".

In a preschool clinic program conducted in the Rosetown Health Region by Dr. Czeslaw Lenk, medical health officer, his staff, and assisting private physicians, almost 900 children received physical examinations. Fifty-five clinics were conducted. The number of children starting school this autumn and therefore eligible for the service was 1,260. Dr. Lenk examined 273 children and general practitioners examined 625, a total of 898, or 74% of those eligible.

Dr. Alexander Robertson, formerly lecturer in social and preventive medicine at the Royal Free Hospital School of Medicine and the London School of Hygiene, has taken up his duties as professor of social and preventive medicine in the College of Medicine, University of Saskatchewan.

Dr. J. B. Norton, senior dentist, Assiniboia-Gravelbourg Health Region, has gone into private practice but continues to serve the health region three days a week.

Dr. Hugh L. Young, assistant medical health officer in the North Battleford Health Region has resigned and returned to Scotland.

Dr. A. G. Lowden has been appointed acting medical health officer of the Prince Albert Health Region in the absence of Dr. David Hosking who is taking the public health course at the University of Toronto.

Miss Marjorie Korol, B.A., has returned to the Division of Health Education after qualifying for the degree of Master of Public Health at the University of California.

Alberta

A project to estimate the morbidity of chronic disabilities in children, with particular reference to genetic defects, has been started under the direction of Dr. J. K. Martin, Professor of Paediatrics at the University of Alberta, in preparation for the Canadian Conference on Children to be held in October 1960.

Prizes totalling \$10,000 are being offered to Alberta residents by the Provincial Department of Public Welfare for the best designs for fifty homes for aged persons which are to be built in rural areas.

A new salary schedule for Alberta's local health services has been announced, and is to be retroactive to April 1, 1958.

At the annual convention of the Alberta Division of the Canadian Medical Association, recently held in Lethbridge, it was announced by the Hon. Dr. J. Donovan Ross, Minister of Health, that a Director of Dental Health would be appointed in the Provincial Department of Public Health.

Miss Mary Janzen has been appointed to the newly established municipal nursing station at La Crete, some 500 miles north of Edmonton.

A recent course for nurse specialists at the Canadian Civil Defence College, Arnprior, Ontario, was attended by Mrs. Janet Bailey, Acting Director of Public Health Nursing in the Provincial Department of Public Health; Mrs. K. E. Jorgensen, Civil Service Nurse; Miss E. Crookshanks, Senior Public Health Nurse in the City of Edmonton School Health Service; Miss Janet Clark, Occupational Health Nurse in Edmonton; Mrs. E. V. Jones, Superintendent of Public Health Nurses in the City of Calgary Health Department, and Miss C. H. Chuchla, Nurse Consultant of the Canadian Cancer Society in Calgary.

British Columbia

The number of community health centers built since federal and provincial funds became available to assist in construction continues to grow. New units have been opened at Pemberton (August 27th) Greenwood (September 2nd) and Grand Forks (October 18th).

A five-day course for hospital cooks was held at St. Eugene Hospital, Cranbrook during October. Sponsored by the Provincial Health Branch and B.C. Hospital Insurance Service and aided by a National Health Grant, this training program was designed for cooks of small hospitals not having the services of dietitians. The

course was attended by 19 cooks from hospitals in the interior of the Province.

Financial assistance by federal grants contributed to the success of a week-long refresher course for medical laboratory technologists, held at the Vancouver General Hospital during the latter part of August. The sessions were so designed that each day included lectures, demonstrations and practical work on the part of the sixteen registrants, who represented hospitals from widespread points in the Province.

The Provincial Health Branch has announced the appointment of Mr. Eric Scott as public relations assistant. His duties will be primarily with the audio-visual aids program and in the editing and writing of educational material.

Outstanding among the items discussed at the semi-annual Health Officers' Council held at Victoria in September, was a proposed program of rheumatic fever prophylaxis. A committee has been established in co-operation with the B.C. Medical Association in order that the latter body may be familiarized with the project and take part in the planning. An early intention of the committee is to establish criteria for diagnosis, one of the chief difficulties in this field.

At the fall meeting of the Pacific Northwest Society of Pathologists in Idaho, Mr. Archie Shearer of the Provincial Health Laboratory in Vancouver was presented with the "Technician of the Year Award", given annually by the Society. The award is made to a technician working in one of the member states or provinces who is considered to have been outstanding in his work and integrity and who is judged to have done the most for medical technologists as a group. His receiving of the Award marks the first time a Canadian has been so honoured by the Society.

The Victoria-Esquimalt Health Department has announced the appointment of a psychiatrist, Dr. Elizabeth Broughton, to help the Department with its mental health program for school and pre-school children. Dr. Broughton will advise public health nurses on the mental health aspects of their work.

IODINE SANITIZERS

OFFER
ALL
THESE
ADVANTAGES

A LONG RECORD OF DEPENDABILITY. Iodine is recognized as a most efficient antiseptic and germicide. It is known to be effective against a wide range of organisms.

SPECIALIZED PRODUCTS. Iodine sanitizers and detergent-sanitizers are offered by leading manufacturers for treatment of milk, food and beverage utensils and equipment. Also available are iodine disinfectant-cleaners for hospitals, schools, institutions, food and beverage plants, and industrial applications.

EFFECTIVE. Iodine preparations are effective in low concentrations... economical, too. Their use can contribute to improved public health.

EASY TO TEST. The well-known iodine color is an indication of solution strength. When the color of an iodine sanitizing solution begins to disappear, that is a signal to replenish or replace the solution. There is no reason ever to let an iodine solution get too weak to be effective. Test kits are available.

Write us for further information, and names of manufacturers offering iodine sanitizers and disinfectant-cleaners in your area. No obligation, of course.

CHILEAN IODINE EDUCATIONAL BUREAU, INC.

Room 2162, 120 Broadway, New York 5, N.Y.

CONNAUGHT

HEPARIN

Heparin is recognized as a blood-anticoagulant having a prompt effect and a wide margin of safety. In the event of overdose or bleeding, the effect of heparin can be rapidly neutralized by intravenous administration of protamine sulphate or whole blood. Clotting times may be determined quickly at low cost.

Use of heparin has been a matter of investigation in coronary atherosclerotic patients with impending myocardial infarction. Doses of about 15,000 units were administered subcutaneously every 12 hours for a period of one or two weeks before commencing treatment with oral anticoagulants. In patients with myocardial infarction, treatment with heparin was prescribed during the first three weeks. After good symptomatic response had been established use of oral anticoagulants was commenced supplemented by approximately 20,000 units of heparin two or three times weekly for two or three months.

Summaries of treatment of deep venous thrombosis and pulmonary embolism show the use of unmodified Heparin preparations in amounts of about 20,000 units daily for from six to ten days. It has been anticipated that heparin would lessen the extent of venous block in leg veins and reduce clot propagation in pelvic veins. Heparin should also lessen propagation of thrombi already lodged in the pulmonary arterial tree.

HOW SUPPLIED

Solution of Heparin—a sterile, neutral solution of the sodium salt containing approximately 110 units per mg. is supplied as follows:

1,000 units per cc.—10-cc. vials

10,000 units per cc.—5-cc. vials.

Solution of Protamine—10 milligrams of protamine sulphate per cc.—5-cc. vials.

RECENT REFERENCES

Engelberg, H., Simplified Heparin Therapy of Impending and Acute Myocardial Infarction, *Ann. Int. Med.*, **44**, 466, 1956.
Crane, C., Deep Venous Thrombosis and Pulmonary Embolism, *New Eng. J. Med.*, **257**, 147, 1957.


CONNAUGHT MEDICAL RESEARCH LABORATORIES
UNIVERSITY OF TORONTO
TORONTO 4, CANADA

*Established in 1914 for Public Service through
Medical Research and the development of
Products for Prevention or Treatment of Disease.*



REAGENTS and MEDIA
for
TISSUE CULTURE
and
VIRUS
PROPAGATION

These reagents are prepared and standardized to preserve unaltered the properties of the original material and include those commonly employed for the slide, roller tube and flask culture techniques for propagation and study of tissue cells and viruses *in vitro*.

REAGENTS OF ANIMAL ORIGIN
Desiccated and Liquid

Plasma, Sera and Serous Fluids
Embryos and Embryo Extracts
Ultrafiltrates

REAGENTS, CHEMICALLY DEFINED
Dilute and Concentrate

Synthetic Media—Eagle-HeLa, Eagle L, Scherer, 199, 703 and all formulas
Balanced Salt Solutions—Earle, Gey, Hanks, Osgood, Simms, Tyrode and all formulas

ENZYMES INDICATORS AMINO ACIDS
HYDROLYSATES MEDIA ENRICHMENTS
BIOCHEMICALS CARBOHYDRATES

Descriptive Literature sent upon request

DIFCO LABORATORIES
DETROIT 1, MICHIGAN

MULTI-VITAMINS

for the
SCHOOL-AGE
CHILD



**formulated to assure four
 fundamental advantages...**

EFFECTIVENESS
ECONOMY
PALATABILITY
STABILITY

Water-dispersible

Charles E. Frosst & Co.
 MONTREAL CANADA

"OSTOMUL"

Each 5 cc. teaspoonful provides:

Vitamin A.....	5000 I.U.
Vitamin D.....	1000 I.U.
Vitamin C.....	75 mg.
Vitamin B ₁	3 mg.
Riboflavin.....	3 mg.
Niacinamide.....	8 mg.
Pyridoxine HCl.....	1.2 mg.
Sodium iodide.....	0.08 mg.

Dosage: One teaspoonful daily, or $\frac{1}{2}$ teaspoonful daily for children under six — at a daily cost of only $3\frac{1}{2}$ to 10 cents, depending on dosage and size of package.

Bottles of 4, 8, and 16 fluid ounces.



EMPLOYMENT SERVICE

Advertisements regarding "positions available" and "personnel available" will be published in from one to four consecutive issues, depending upon the requirements of the agency or person concerned. They are limited to seventy words or less, with a confidential box number if desired. There is no charge for this service to members of the Association. Health agencies are charged a flat rate of \$10.00 for the advertisements (up to four consecutive issues) and for the service. The rate for non-members is \$5.00. The service includes confidential clearing of information between prospective employer and employee if desired.

Medical Officer of Health required for North Eastern Alberta Health Unit at St. Paul, 135 miles east-north-east of Edmonton. Salary range \$7,200 to \$8,400 for graduate without D.P.H. or \$7,800 to \$9,180 for graduate with D.P.H., with credit for previous experience. Pension plan as for Provincial Civil Service. For further particulars and application forms write to Dr. E. S. Orford Smith, Division of Local Health Services, Department of Public Health, Administration Building, Edmonton, Alberta.

11-12

Bacteriology Technician. B.Sc. with Bacteriology or Technician R.T. with speciality of Bacteriology, required by large general hospital. Some experience in practical hospital bacteriology preferred. Apply in writing to Personnel Manager, outlining experience and qualifications and indicating acceptable salary. The Montreal Children's Hospital, 2300 Tupper St., Montreal, Que.

11-12

Public Health Nurses for generalized program, rural and urban. Salary range \$3,300-\$4,300. Annual increment \$200. Pension plan, Blue Cross, four-week vacation, cumulative sick leave. Apply to J. R. Mayers, M.D., D.P.H., Director, Norfolk County Health Unit, 58 Peel Street, Simcoe, Ontario.

10-1

Sanitary Inspector required for generalized program with Bruce County Health Unit. Pension and accrued sick leave plans in effect. Car allowance 9¢ per mile. Salary in accordance with experience and qualifications. Apply to T. H. Alton, Secretary-Treasurer, Bruce County Health Unit, Walkerton, Ontario.

11-12

Sanitary Inspector required for generalized duties with Peel County Health Unit. Salary range \$3,400 to \$4,400. Annual increment \$200, generous allowance for experience. Unit is a suburban-rural area adjacent to Metropolitan Toronto. Car allowance and pension plan, Blue Cross, P.S.I., and group life insurance available. Write, stating starting salary anticipated, experience, availability, etc. to Dr. D. G. H. MacDonald, Medical Officer of Health, 44 Nelson St. W., Brampton, Ont.

9-12

Sanitary Inspector required by the Township of London for generalized program. Salary range \$3,000-\$4,000 with allowance for experience. Workman's Compensation, Health and Insurance, Pension Plan available. Car allowance paid. Apply to J. R. Reynolds, Clerk, Township of London, Arva, Ontario.

12-3

**YOU'RE NEVER IN DOUBT
WHEN IT'S
"ALCONOX-
CLEAN"**

In the laboratory or hospital, just "clean" isn't good enough. Make sure your glassware and equipment are "Alconox-Clean."

- Proven best by test* for over 20 years!
- * for wetting power!
- * for sequestering power!
- * for emulsifying effect!

Use ALCONOX

For all equipment washed by hand

Box of 3 lbs. \$2.18

Case of 12 boxes — 3 lbs. ea. \$23.54

Available in drums of 25, 50, 100 and 300 lbs. at additional savings!

(Canadian Prices)



SAVE TIME & MONEY

with

ALCONOX

The World's Most Thorough Cleaner — Yet it costs up to 75% less!

Eliminates tedious scrubbing — Penetrates irregular and inaccessible surfaces — Removes dirt, grease, grit, blood, tissue, etc. with amazing ease — Completely soluble and rinsable — Gentle to the skin —

Use ALCOJET

For all equipment washed by machine

Box 5 lbs. \$3.90

Case of 6 boxes — 5 lbs. ea. \$19.50

Available in drums of 25, 50, 100 and 300 lbs. at additional savings!

(Canadian Prices)



Order from your Supplier or ask him for samples.

ALCONOX, Inc.

853 Broadway, New York 3, N.Y.

**PROFESSOR OF PREVENTIVE
MEDICINE**

The University of Alberta invites applications for the position of Professor and Head of the Department of Preventive Medicine, in the Faculty of Medicine. Duties will include administration of the department, teaching of graduate and undergraduate students and a program of research. Salary will be \$10,000 per annum with consulting privileges.

Interested applicants should send a complete curriculum vitae, names of three referees, and a recent photograph to the office of the Dean of Medicine, University of Alberta, Edmonton, Alberta.

**ASSISTANT DIRECTOR
MATERNAL AND CHILD HEALTH
DIVISION (Bilingual)**

QUALIFICATIONS: Diploma in Child Health or a Diploma in Public Health with experience in Obstetrics and/or Pediatrics preferred. Ability to speak and write both English and French fluently.

DUTIES: The duties are of a professional nature and involve administrative and field work in respect to the organization and direction of a Maternal and Child Health program.

SALARY RANGE: \$7,200-9,000 per annum. Annual Increment \$300.

Full Civil Service Benefits including three week's vacation with pay, sick leave benefits, superannuation and retiring leave.

APPLY: Civil Service Commission
P.O. Box 1055
Fredericton, New Brunswick



where eczema is a problem

New Heinz CORN Cereal is a *single grain* cereal—well tolerated by babies with eczema and protein allergies.

It is also a new delight for *all* babies. New Heinz Corn Cereal is one of the very best tasting cereals ever developed for babies.

SAMPLING INVITATION—Write now for samples for tasting and testing. We will welcome your request—write: Heinz Baby Cereals, Leamington, Ontario.

BFM-258A

NEW HEINZ CORN CEREAL TYPICAL ANALYSIS

Carbohydrate	82.3%	Copper0005%
Protein	5.2%	Sodium Chloride	1.31%
Fat	1.3%	Niacin (mg./100 gm.)	28.0
Crude Fibre	1.0%	Thiamine (mg./100 gm.)	1.26
Moisture	7.4%	Riboflavin (mg./100 gm.)	0.68
Ash (Minerals)	2.8%	Calories per 100 gm	362
Calcium065%	Calories per ounce	103
Phosphorus108%	Tablespoons per ounce	10
Iron050%		

HEINZ BABY CEREALS⁵⁷

NOW WE ARE SEVEN...RICE • BARLEY • OATMEAL • WHEAT • MIXED CEREAL • INFANTSOY • CORN

Printers to the University

UNIVERSITY OF TORONTO PRESS

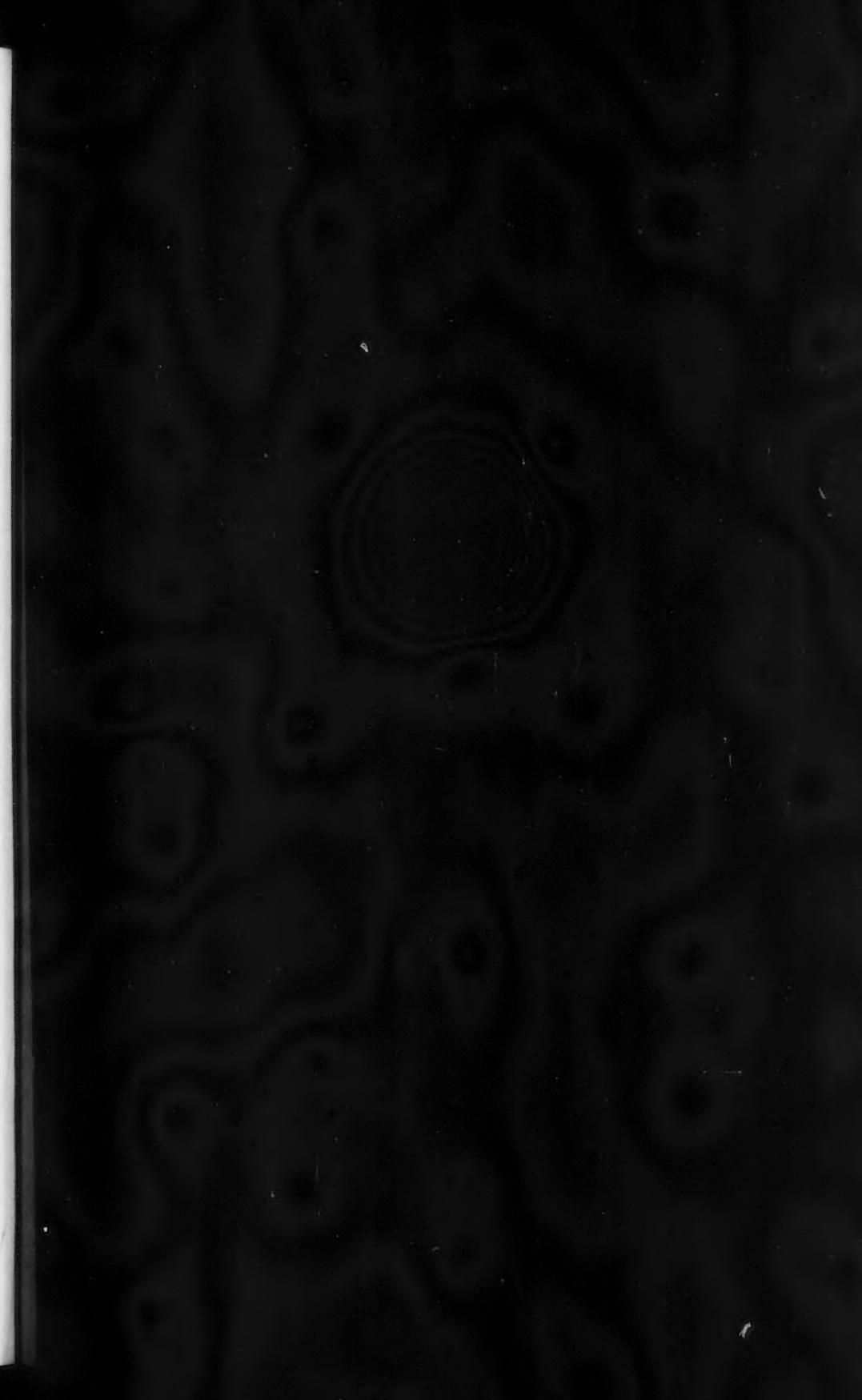


*An imprint that guarantees
a product of the highest distinction*

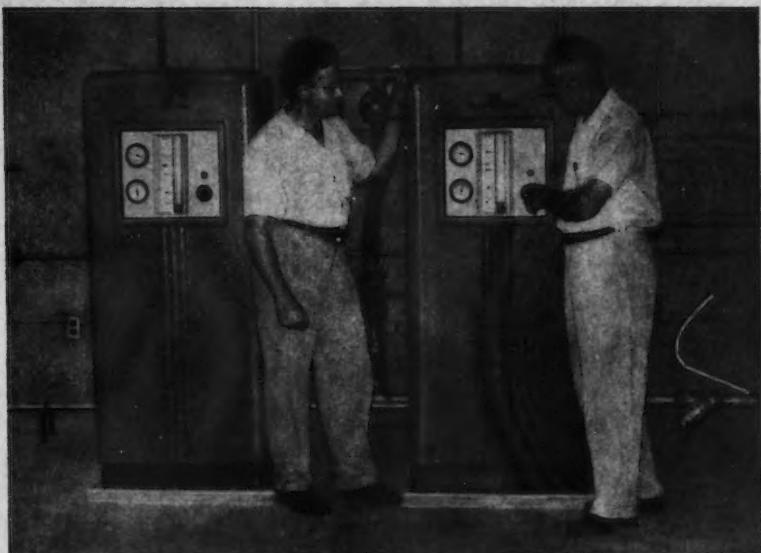
UNIVERSITY OF TORONTO
School of Hygiene

PROFESSORSHIP IN INDUSTRIAL HEALTH

Applications are invited from physicians with experience in teaching and research in industrial health or applied physiology. The applicant selected will be appointed to the post of Head of the Department of Physiological Hygiene, School of Hygiene, University of Toronto, as of July 1, 1959. The post carries the rank of full Professor, at a salary of \$12,000 per annum. The main teaching duties of the Department include teaching industrial health and applied physiology to post-graduate students in the courses leading to the Diploma in Public Health and the Diploma in Industrial Health. Applications, with names of referees, to be submitted to Dr. A. J. Rhodes, Director, School of Hygiene, University of Toronto, Toronto 5, Canada.







J. Pauli, Chief Engineer and W. Johnson, Chief Chemist of the St. Joseph, (Mo.) Water Company, discuss operation of their W&T V-notch chlorinators. The St. Joseph Water Co. is part of the American Water Works Service Co., Inc. system.

W & T V-notch Chlorinators — doubly accepted

The St. Joseph Water Co. found breakpoint chlorination the best way to treat Missouri River water. But this increased the range of chlorine requirements in the water treatment. W&T V-notch chlorinators were the answer.

W&T V-notch chlorinators have a chlorine feed range of 20 to 1 with an accuracy of 4%. Based on this acceptance at its St. Joseph plant, the American Water Works Service Co., Inc. has purchased V-notch equipment for use in other plants.

V-notch chlorinators are available to feed from 2½ to 8000 pounds of chlorine per 24 hrs. V-notch equipment also provides permanence and attractiveness through modern reinforced plastics. For comprehensive information about W&T V-notch chlorinators, write for Bulletin S-122.14.



WALLACE & TIERNAN LIMITED

Head Office and Factory: Weston Ave. north of Eglinton East—Box 54, Toronto 13, Ont.
Montreal Winnipeg Calgary Halifax

SPIN 1500 ml at 26,000xG
and maintain material temperature
at 0°C with
ALL-NEW MODEL HR-1
INTERNATIONAL HIGH-SPEED
REFRIGERATED CENTRIFUGE

This unique combination of large capacity, higher speed, and lower controlled temperature increases the value of centrifugal force as a basic research tool.

HIGH "G" HEADS: The 8-place 50 ml head delivers 40,000 x G; the 6-place 250 ml head, 26,000 x G. Adapters are available for use with smaller tubes. Additional heads and attachments are being developed.

HIGH SPEEDS are obtained by a direct drive, special motor. Speeds are set by a stepless autotransformer control.

TEMPERATURES BETWEEN -20°C and +40°C are kept constant within $\pm 1^\circ\text{C}$ by a 1 HP refrigeration unit, an exclusive fin-coiled evaporator, and a new combination of plastic foam and fibre glass insulation.

USE THE COUPON to get all the facts about this all-new and better high-speed refrigerated centrifuge from International... Your Dependable Source for Centrifugal Force.

International  **Equipment Co.**

1206 SOLDIERS FIELD ROAD, BOSTON 35, MASS., STADIUM 2-7900

Please rush complete data, prices and delivery schedules on International's new HR-1 High-Speed
Refrigerated Centrifuge.

Name.....

Institution.....

Street & No.

Title.....

Zone..... State.....

7584

